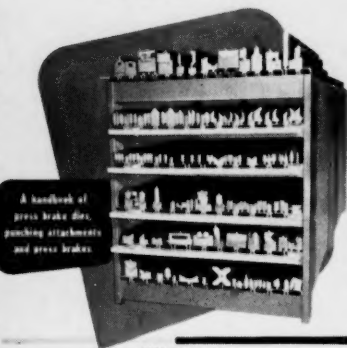


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**DIE MANUAL**



CATALOG DM-53

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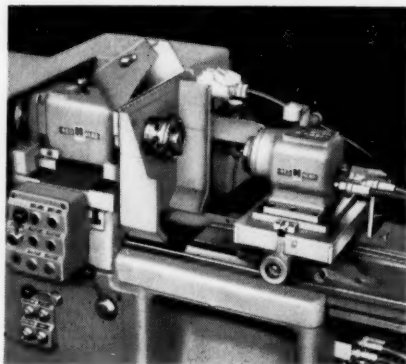


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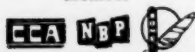
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# MODERN Machine Shop

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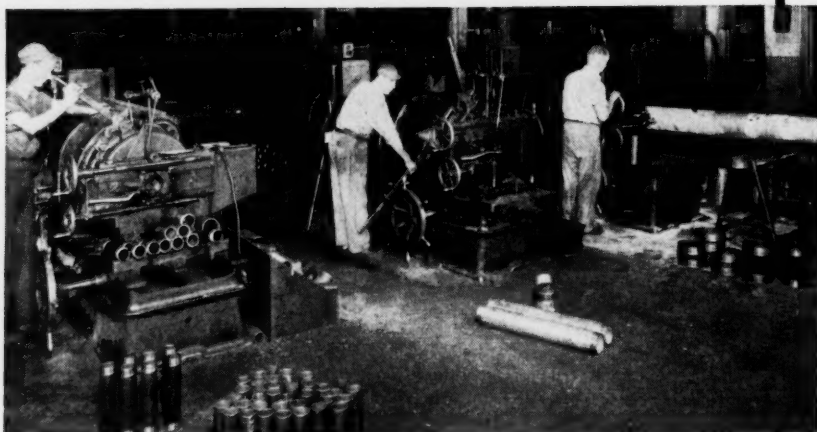
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# LANDIS PIPE THREADING MACHINES

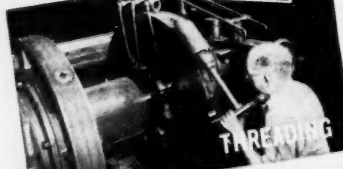


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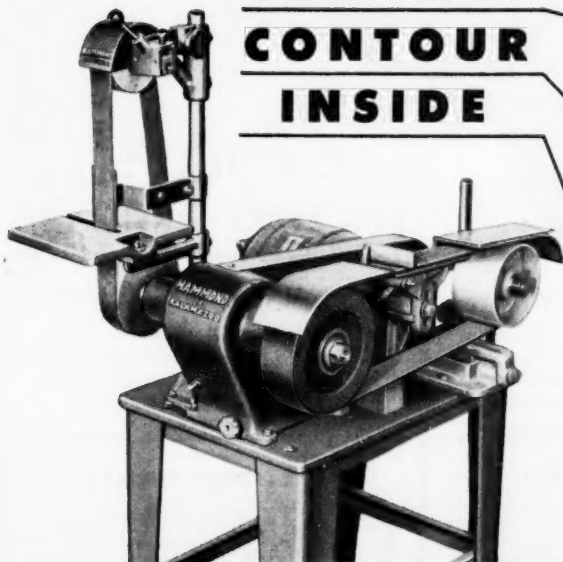
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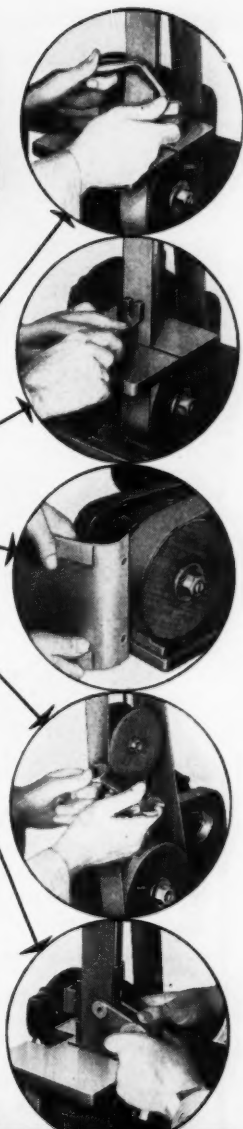
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August, 1953

MODERN MACHINE SHOP 3

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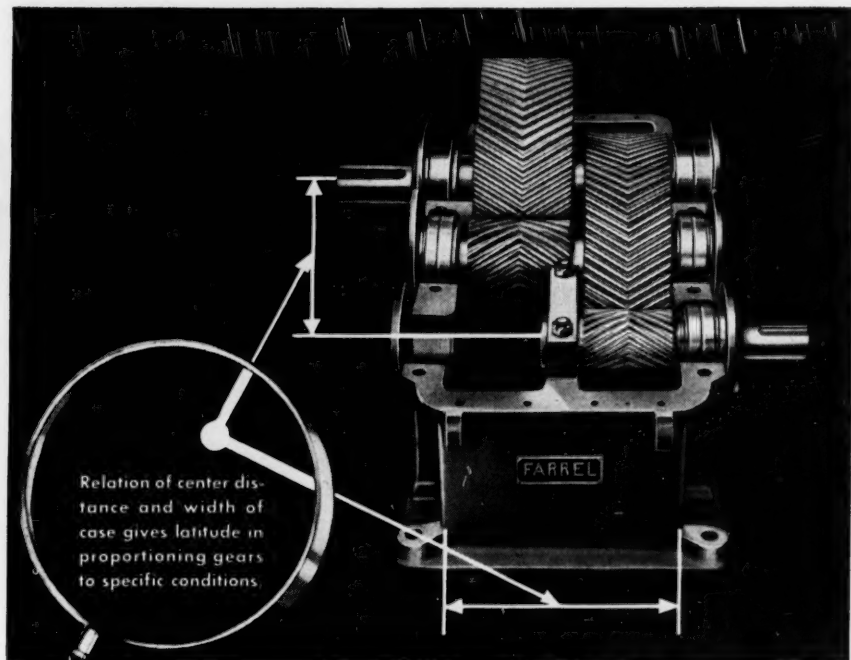


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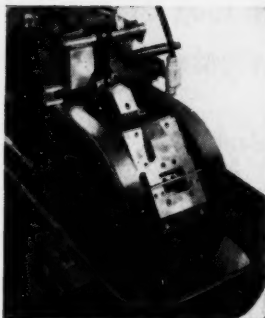
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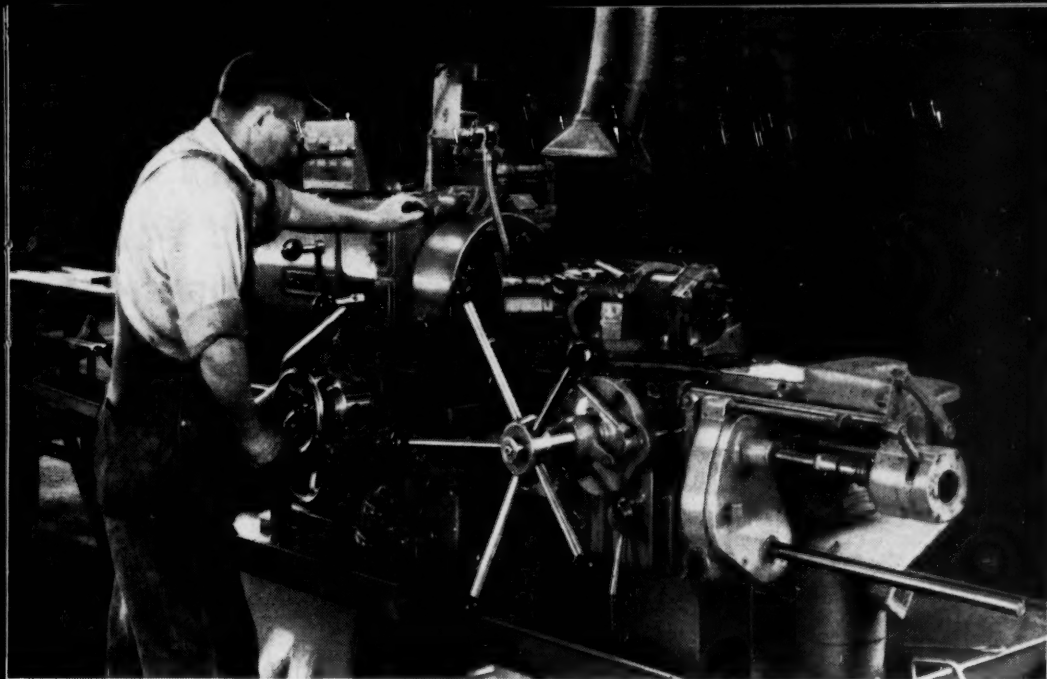
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This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used

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Here, again, Gisholt Ram Type Turret Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

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**MACHINE COMPANY**

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*represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts.*  
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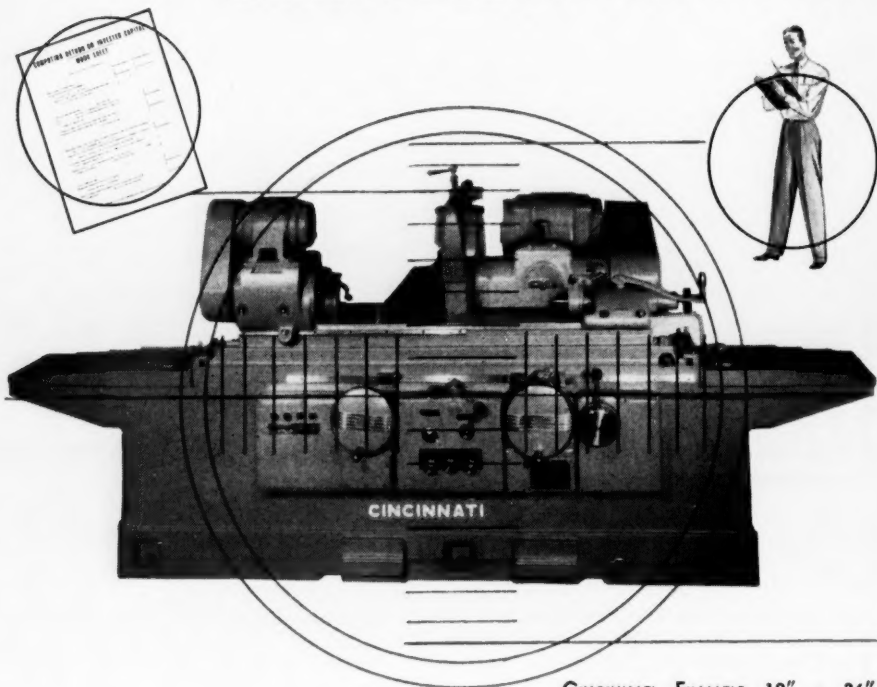
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Write for catalogs. No. G-566-2 for  
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the 10" and 14"-L sizes.



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CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

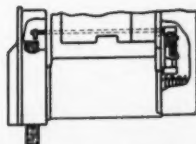
# Look at it

## HYDRAULIC GRINDERS

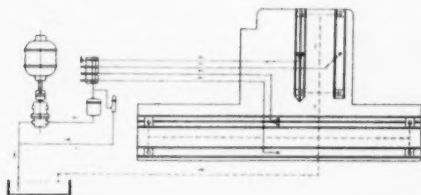
Look at the spindle bearings, the bed construction, lubrication of ways, electrical controls. Look at everything that effects efficient, low-cost production of precision centertype grinding, and you'll agree that CINCINNATI FILMATIC Plain Hydraulic Grinders have the potential to save a lot of money for your shop. A few ways in which the superior features of CINCINNATI FILMATICS keep costs at a minimum are illustrated at the right.



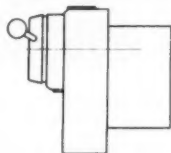
CINCINNATI'S exclusive FILMATIC bearings for the grinding wheel spindle require no adjustment; over 99% have never required service or maintenance.



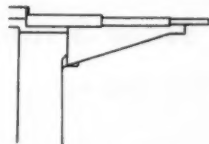
To minimize wheel cost, these machines are equipped with a two-speed device for the grinding wheel.



Automatic filtered lubrication of ways aids greatly in maintaining straight-line traverse and close accuracy for years.



Unit construction for principal hydraulic elements cuts maintenance expense.



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**CINCINNATI GRINDERS INCORPORATED • CINCINNATI 9, OHIO**



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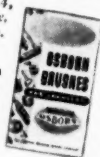
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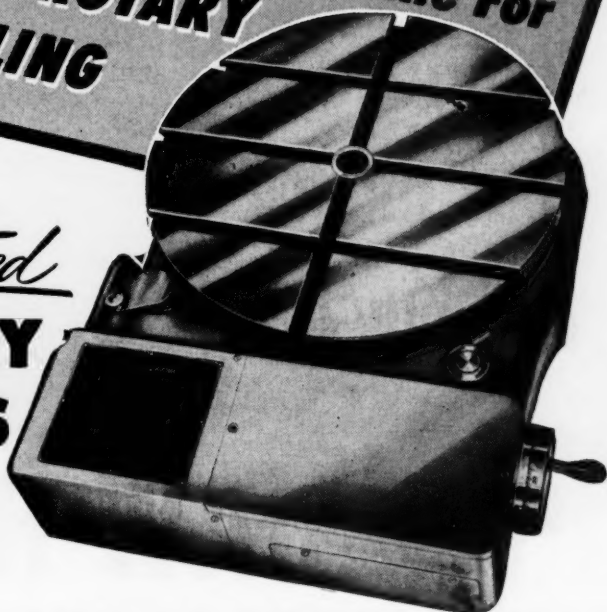


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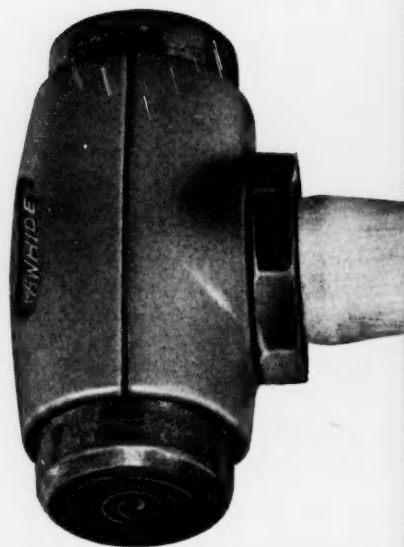
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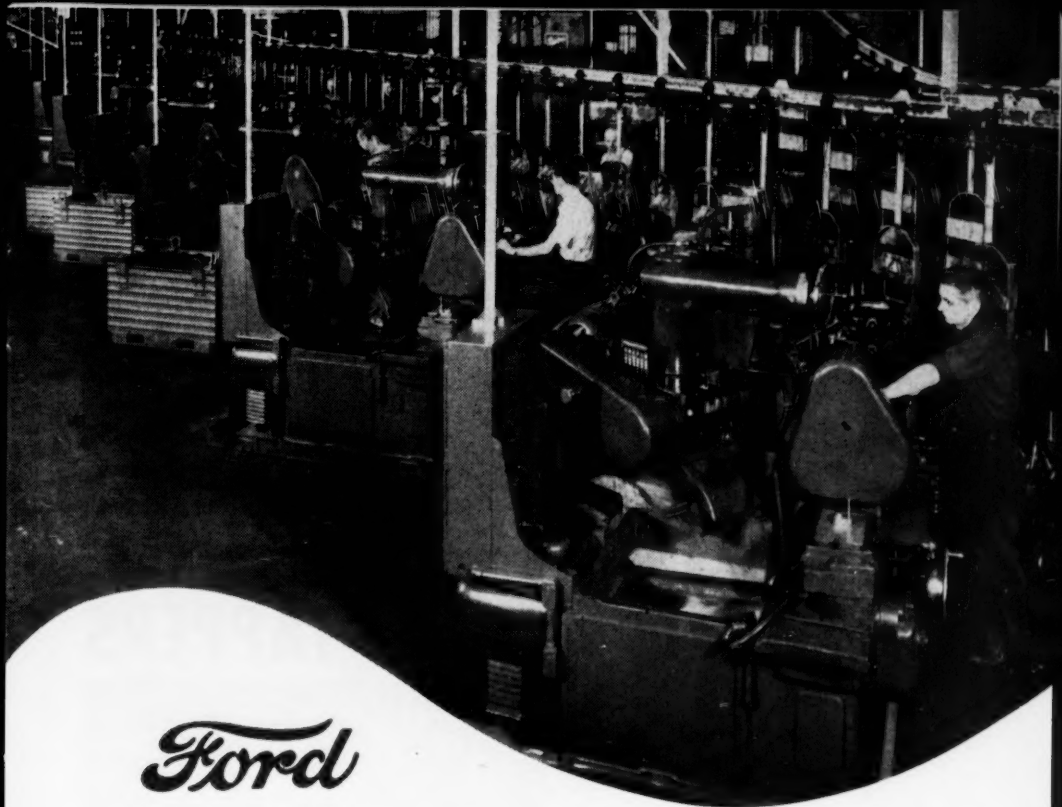
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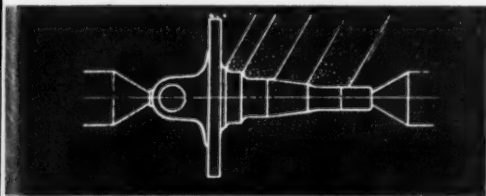
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 Machine—Type CH Plain Grinder with Angle Wheel Base  
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 Limits—.0005" on diameter  
 .010" on radius  
 Material—Steel Forging



141AS

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Multiple  
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and  
Drilling ...**

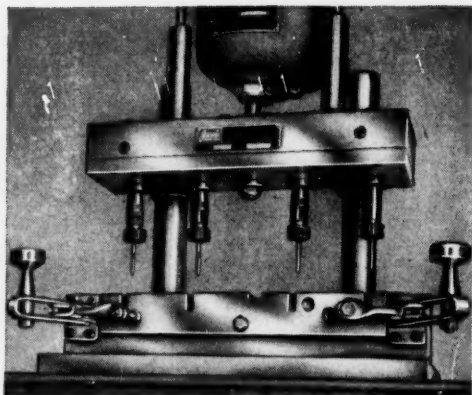
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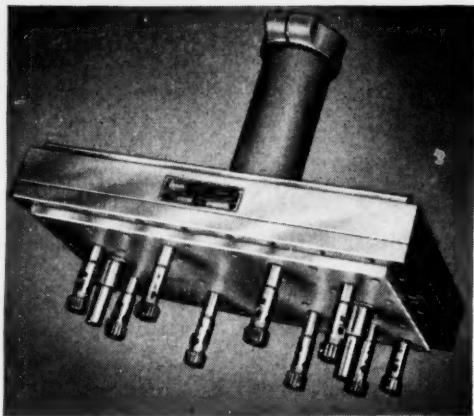


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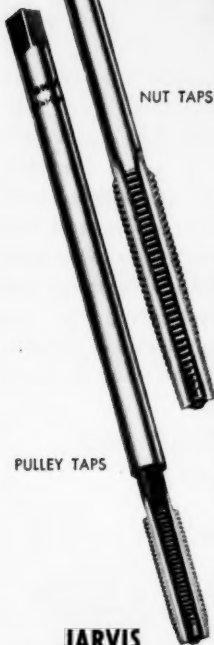
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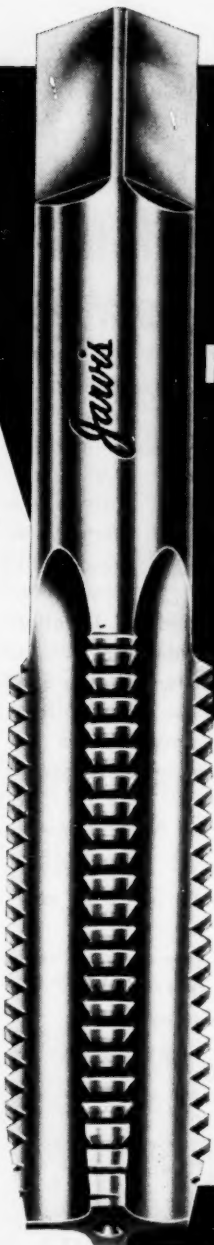


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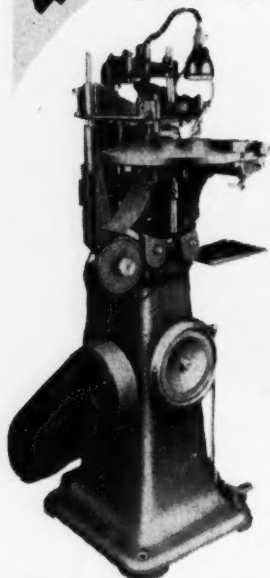
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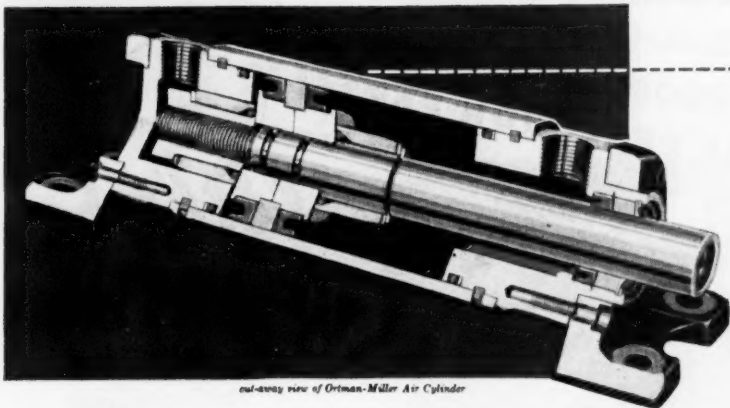
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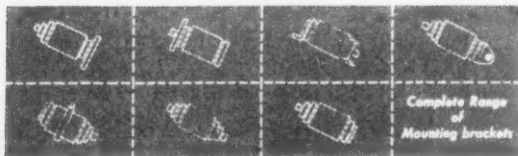
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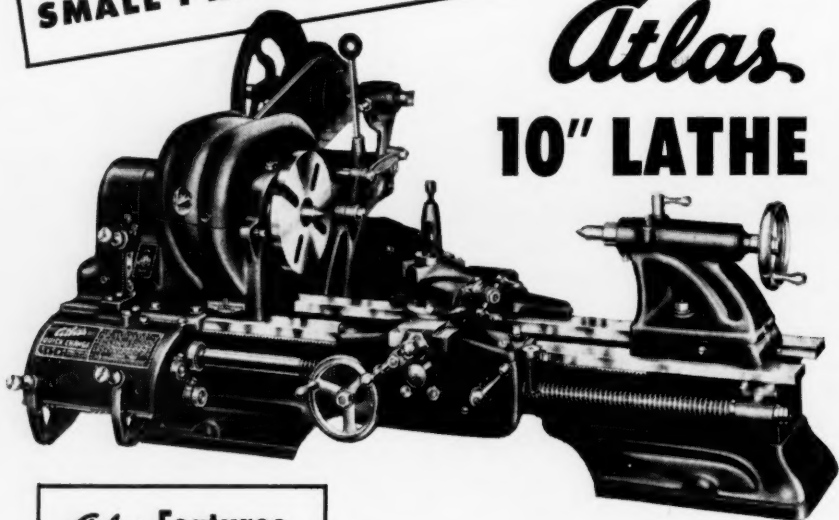
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# **LOW COST LATHE** *-Timken Bearing Equipped!*

**CUTS PRODUCTION COSTS ON  
SMALL PRECISION PARTS!**

## *Atlas* **10" LATHE**



### *Atlas* Features

- ★ Timken Tapered Roller Bearings
- ★ 16 Spindle Speeds — 28 to 2072 RPM
- ★ Precision-Ground Bed
- ★ Power Cross and Longitudinal Feeds

Today's best 10" lathe value by every standard is the Atlas "Quick-Change." It's the only 10" lathe with Timken tapered roller bearings. Wide thread, feed, and speed ranges provide extreme versatility—and it is built to handle 24-hour production runs week after week. New Atlas bed turret, lever-type carriage turret, and collet chuck convert the Atlas into the lowest cost turret lathe available. Send for latest catalog and literature.

### **ATLAS PRESS COMPANY**

**812 N. PITCHER ST., KALAMAZOO, MICHIGAN**

*Atlas*

**DEPENDABLE QUALITY TOOLS SINCE 1911**



# look...

## any one of these 24 punches and dies

**READY FOR USE IN 5 SECONDS**

*without set-up!*

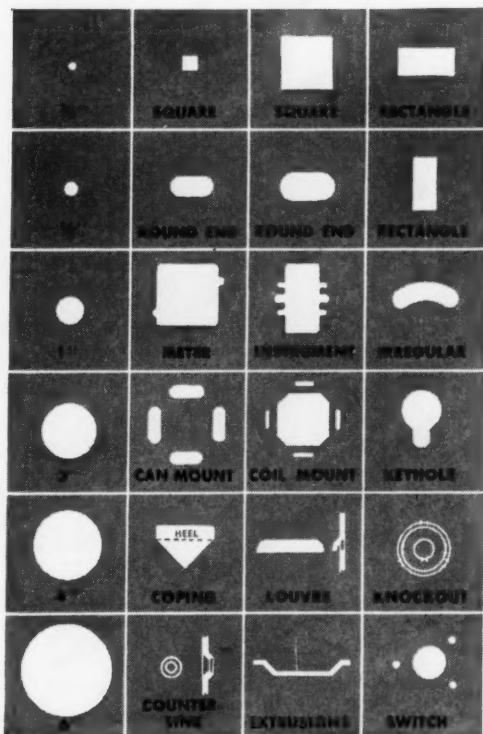
- Or, any selection of 12 to 32 punches and dies suited for your work.
- A Wiedemann Turret Punch Press has the tools where you want them—in the press—not on the shelf.
- In 5 seconds the operator selects the punch and die, and pierces the opening in flat sheet metal or plate.
- Any punch and die in the turret can be replaced with other sizes in less than 2 minutes.

**WITH A WIEDEMANN YOU CAN  
SAVE 60% TO 90% ON SMALL LOT PIERCING  
because you**

**Eliminate Set-up  
Eliminate Layout with Wiedemann Work  
Locating Gauges  
Reduce Handling Time**

**We will make time studies on your work without  
obligation. Send prints.**

*Plan view of lower  
turret of typical  
Wiedemann with  
18 stations.*



# WIEDEMANN MACHINE COMPANY

4219 Wissahickon Ave., Philadelphia 32, Pa.



**END MILLING**

**MORSE!"**



**A** lot of *standard* Morse End Mills would be specials in anybody else's catalog!

Want them short and stubby, or long and lean? Or with ball-end for die cavities, fillets, and round-bottomed holes and slots? Or with *left-hand* spiral but *right-hand* cut to push chips ahead? Morse makes all these, *and more* . . .

For instance, Morse also makes them with two flutes, cleared to cut to center for

plunge-cutting . . . with taper shanks to fit machine spindles . . . and in shell types for face or slab milling cuts. Not to mention a complete size-range in the exclusive shear-cutting design known as Morse Hi-Helix.

So if you want an end to your end-mill problems, get hold of your Morse-Franchised Distributor. He has every type you could possibly need . . . and he knows how to engineer it to your job. *Call him now.*

#### MORSE TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASSACHUSETTS

(Division of VAN NORMAN CO.)

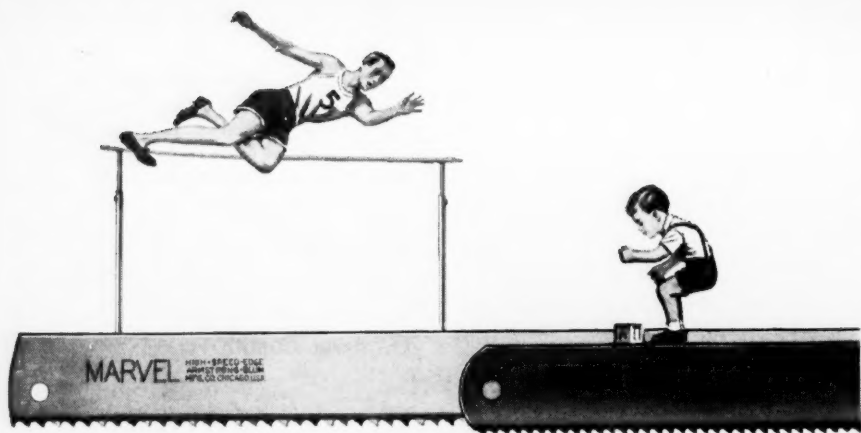
Warehouses in New York, Chicago, Detroit, Houston, San Francisco



# MORSE

## Cutting Tools

*Buy them by phone from your  
Morse-Franchised Distributor  
and save ordering time*



...but

## *Experience Cannot be Copied*

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

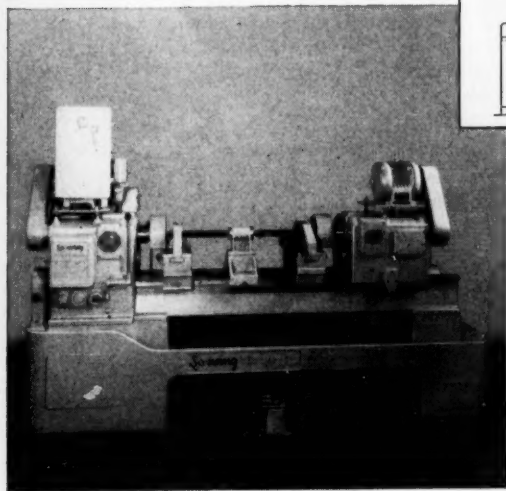
Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

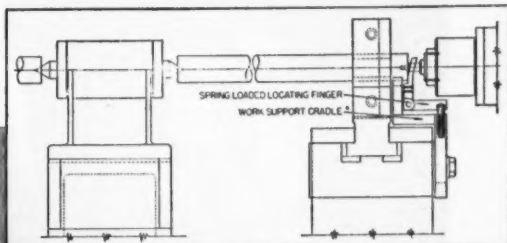
# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



## MODEL "CS" Lo-swing CENTERING MACHINE CUTS COSTS BY CENTERING TWO SHAFTS SIMULTANEOUSLY

**Problem:** To center one end of two shafts simultaneously or during one cycle of the machine. The previous operation on the shafts consisted of cutting shafts to length and centering one end in an automatic cutting-off machine.



**Solution:** The Model CS Automatic Centering Machine selected for this job was equipped with two standard air operated vises for holding the two shafts close to the ends to be centered. A special fixture (shown between the two vises) was designed with two centers to hold and locate the two shafts on the ends previously centered.

This method of holding and locating the parts assures constant overall distance between the two centers in each part within close tolerances.

The line illustration shows the detail of the work support and spring loaded locating finger supplied with each vise. The spring loaded locating finger holds the shaft under tension on the double center fixture until the shafts are clamped tightly in the vises.

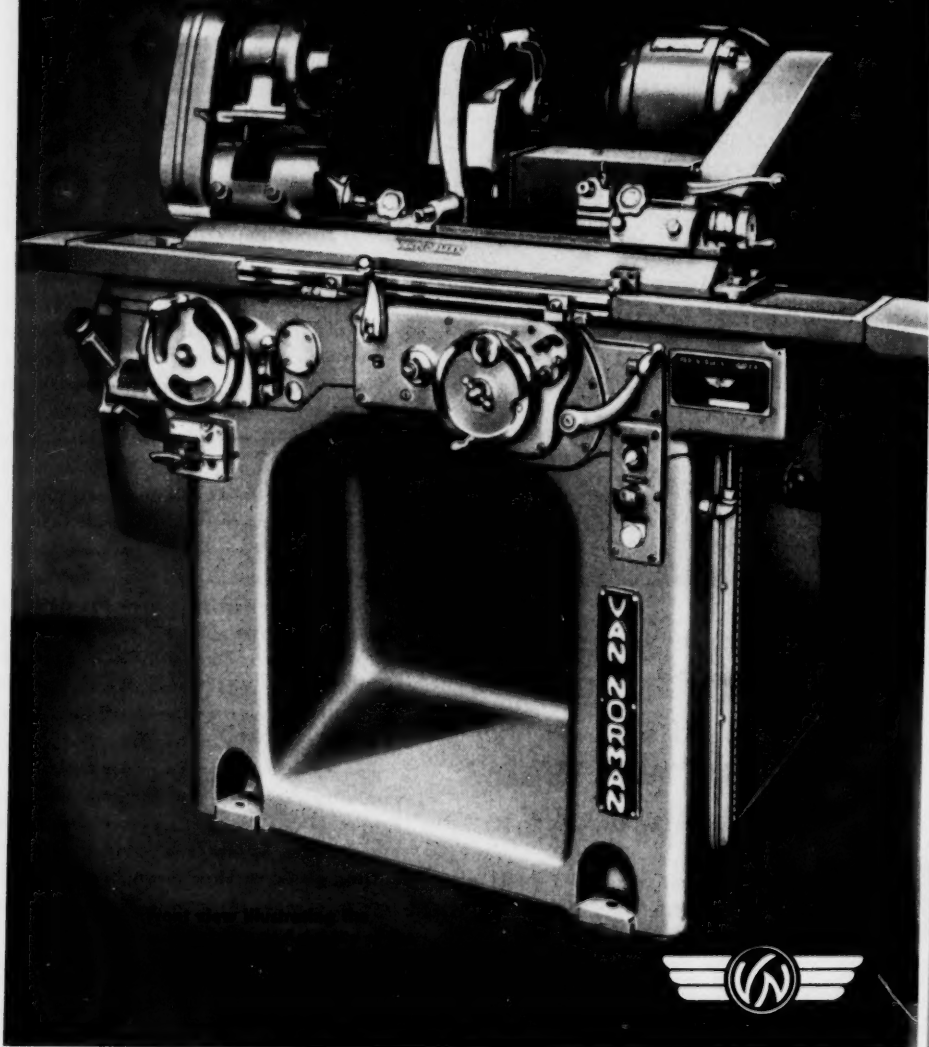
The machine is entirely automatic in operation after the shafts are clamped. The operator simply pushes the starting lever and the centering spindles advance in rapid traverse to the cutting position, slow down for feed, and then return in rapid traverse to the starting position ready for unloading and reloading.

Seneca Falls engineers welcome inquiries involving your machining problem.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

## PRODUCTION COSTS ARE LOWER WITH Lo-swing

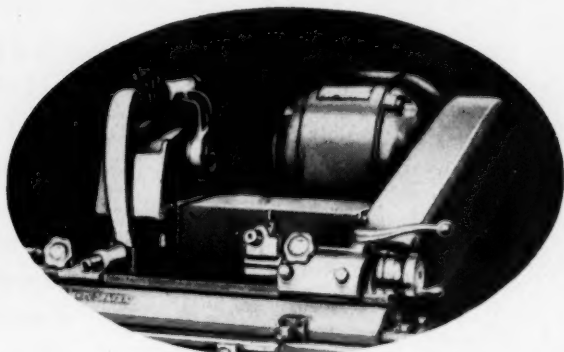
# VAN NORMAN 418





# CYLINDRICAL GRINDER

***Engineered for Fast, Economical  
"Close-Tolerance" Plunge or Traverse  
Grinding of Small Parts***



Grinding unit designed for maximum accuracy and long life. Pope wheel spindle equipped with heavy-duty, extra-large SKF double-row cylindrical roller bearings, assures smooth chatter-free finish.

The Van Norman 418 Cylindrical Grinder is completely engineered from base to bearings to give heavy machine performance. It is particularly adaptable for economical grinding in toolrooms, job shops or plants where work is usually in small or medium runs. Controls are conveniently grouped for ease of operation.

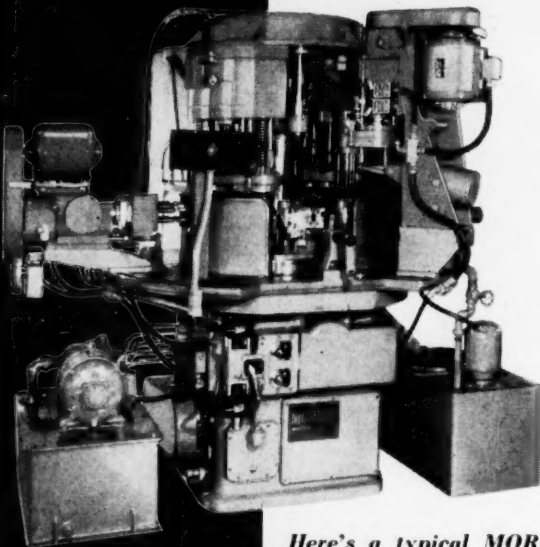
Write for bulletin giving complete details. Especially inquire about the price. It's exceptionally low for a quality grinder.

#### **OTHER VAN NORMAN FEATURES**

- Heavy-duty headstock and footstock for rigidity, accuracy and smooth grinding
- Single lever control for rapid traverse and plunge grinding
- Automatic starting and stopping of headstock and table traverse
- Rugged base, wide table bearing ways, separate motor drives for wheel spindle, table and headstock
- Floor space needed, only 43 $\frac{3}{4}$ " x 79 $\frac{1}{4}$ "

**VAN NORMAN COMPANY, SPRINGFIELD 7, MASS.**

how little does it cost...



Producing 170 finished transmission control valve bodies per hour at 100% efficiency, this machine performs 32 drilling and tapping operations in two cycles.

to get  
"special  
machine"  
production  
with  
combination  
standard  
units?

*Here's a typical MOR-SPEED answer to an ever-more important problem:*

A combination of Morris standard units . . . center column, base, indexing mechanism and hydraulic units . . . plus a made-to-order vertical and auxiliary side heads . . . make up this high production machine. Cost is less, delivery faster . . . the user gets the accuracy and low cost production of a "special" without the usual sky-high costs and limited application of conventional units.

Consider the multiple savings . . . investment, labor, time and floor space . . . of MOR-SPEED multiple machining. Let Morris Engineers prove that high production and precision can be yours for less than you might imagine.

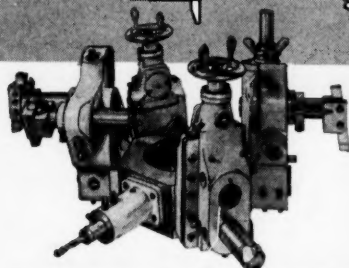
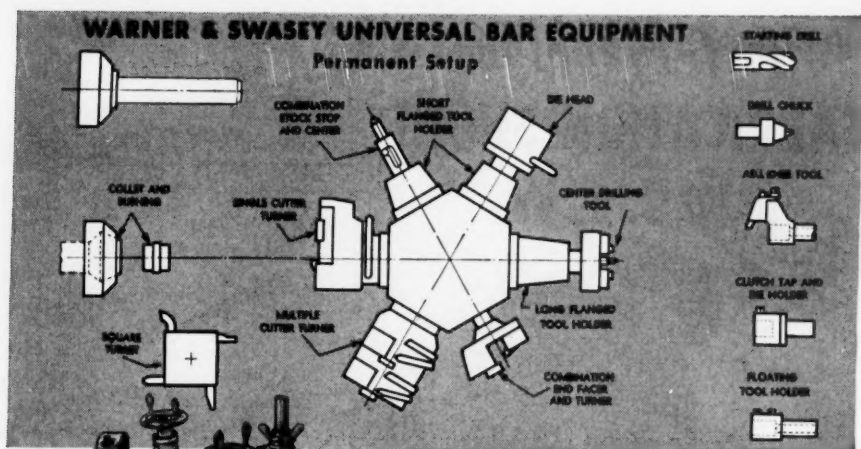
a better product  
at less cost  
with precision  
plus production



*Morris*

**THE MORRIS MACHINE TOOL CO.**

934 HARRIET ST.  
CINCINNATI 3, OHIO



## Use Warner & Swasey Standard Tools to **SPEED UP—SIMPLIFY YOUR PRODUCTION**

**Y**ES, you can make Warner & Swasey standard turret lathe tools and Universal Tooling Setups *pay off*—with increased production, less setup, handling and cutting time, longer tool life. This free book clearly and simply explains how to select tools and improve setups, combined and multiple cuts, and many other modern tool applications. Fill in and mail the handy coupon for your free copy—*today!*



**YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS  
WITH WARNER & SWASEY MACHINE TOOLS,  
TEXTILE MACHINERY, CONSTRUCTION MACHINERY**



8-53

**WARNER & SWASEY COMPANY**  
Department 320-MM, Cleveland 3, Ohio

Please send me my free copy of "Turret Lathe Tools" today!

Name .....

Company .....

Position .....

Address .....

City ..... Zone ..... State .....

# A 1-Machine FABRICATION SHOP!

*"Buffalo"* U. I. W.



For fabrication of a wide range of structural members, you'll find a "Buffalo" Universal Iron Worker a regular 1-machine shop! Yet it takes only the space of one machine, and two operators can turn out work simultaneously—at a production clip, one at the punch head, the other at the shear or bar cutting head. Rugged

electrically welded steel plate frame, not cast iron. Handy hold-downs. Easy, one-shot centralized lubrication system in most models. 5 models to handle your requirements. **WRITE NOW** for Engineering Bulletin, stating range of shapes and sizes to be fabricated.



Cut, notch, cope, punch angles, tees, channels I-Beams

Punch web and flange of channel



45° Miter



Trim leg of tee



Cope angle leg



Cut rounds, squares, reinforcing bars



Punch, slit, miter, shear flat bars

**CUTS—PUNCHES—SHEARS—  
SLITS—MITERS** your  
structurals without changing tools!

*"Buffalo"* MACHINE TOOLS  
**BUFFALO FORGE COMPANY**

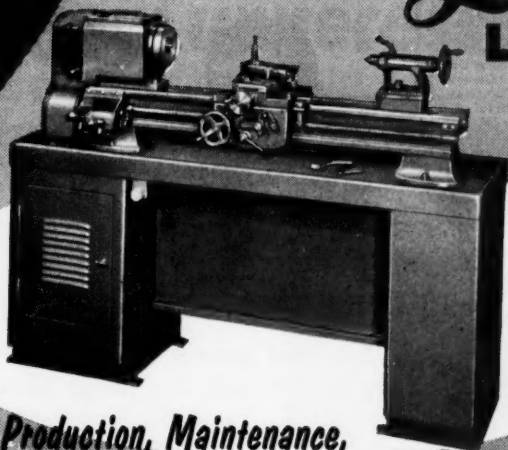
338 Broadway

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

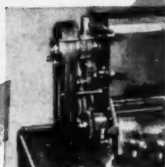
**DRILLING PUNCHING CUTTING SHEARING BENDING**

# Presenting THE 12" SWING.. *Logan* LATHE



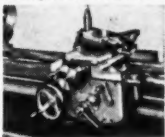
**For Production, Maintenance,  
Tool Room or Shop Work**

With  
FEATURES  
LIKE THESE



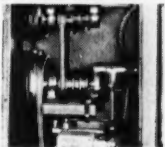
**OUTBOARD V-BELT DRIVE**

Double V-Belts transmit power to headstock with maximum efficiency. Easy to adjust.



**NEWEST, FINEST CARRIAGE**

Rigid, accurate. Precision ground top surfaces on cross slide and saddle permit mounting fixtures and use of magnetic indicators. Apron operates in bath of oil. Convenient lever operates disc type clutch.



**UNDERNEATH V-BELT DRIVE**

Jack-shaft and countershaft turn on ball bearing mounting. All parts enclosed, yet accessible. Lever operated belt tension release.

## IT'S BIG...

With 12" swing, 1" collet capacity, 1 3/8" spindle hole, and 35" center distances this newest Logan handles most lathe work.

## IT'S RUGGED...

Heavy headstock, massive spindle and rugged construction throughout make it a lathe of precision, stability and power.

## IT'S VERSATILE...

Hogs out heavy cuts smoothly. Equally effective in high speed production and second operation work. Sustained accuracy at all spindle speeds (38 to 1260 rpm) is inherent in the ball bearing spindle mounting. Features like extra, large compound and cross feed dials adapt it to exacting tool room operations. Durable construction and enclosed design are important advantages in the school shop.

## IT'S ACCURATE...

Wide-spaced, oversize ball bearing spindle mounting means *sustained* accuracy. Total spindle run-out, 12" from bearing is less than .0005". 6 1/8" wide bed is heavily ribbed for rigidity. 2 V-ways and 2 flat ways precision ground to within .0005". Large dials on new carriage permit accurate readings. Precision built throughout.

## IT'S SIMPLE TO OPERATE...

No spindle adjustment for any speed from 38 to 1260 rpm. Dials are easy to read, controls easily accessible. Outboard drive simplifies belt adjustment. New operators quickly master it.

## IT'S ECONOMICAL...

By multiple savings—investment, maintenance, space and power—the 12" Logan brings new economy and profits to lathe operation.

Get full facts—See your Logan Dealer—or WRITE to  
**LOGAN ENGINEERING CO.**  
Lawrence and Lamson Avenues Chicago 30, Illinois

## News About Created-Metals

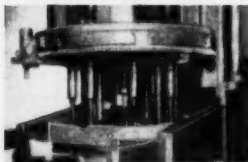
### New "Brief-A-Log" Simplifies Ordering



A new condensed catalog and price list is being offered by the Carboloy Department of General Electric Company. This "Brief-A-Log" (GT-265) incorporates Carboloy price reductions made June 22, and latest additions to the standard lines of tools and blanks.

Designed to simplify selecting and ordering, the Brief-A-Log is available free of charge. (Send coupon at right.)

### Drill Cast Iron with Carbide Twist Drills



Drilling cast iron with carbide twist drills is definitely past the "maybe" stage. Users report doubled production, more than tripled drill life over H.S.S. drills, without any special drilling equipment or job engineering. Sound, how-to-do-it technical bulletins available free. Write Carboloy Department of General Electric Company. (See address at right.)

### New Applications for Carbide Press Dies

Carboloy carbide dies are being profitably applied to blanking and piercing operations where production runs are high.



These dies are economical to use because they produce burr-free, close-tolerance work . . . outlast steel dies by 8 to 10 times.

Write for free Carboloy Die Engineering Manual D-124. (See address at right.)

YOUR CARBOLOY FIELD ENGINEER SAYS . . .

## "Large, costly special



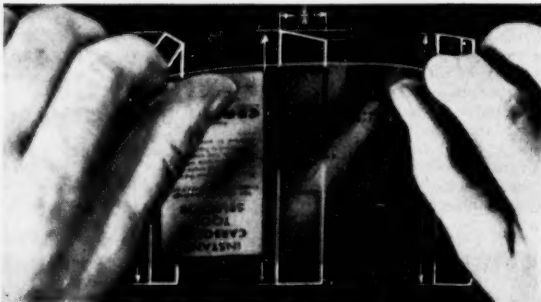
### "Cut your special single-point tool stocks up to 30% with this simple-to-use MTI Plan

"The Minimum Tool Inventory Plan is based on the fact that the 11 Standard Carboloy Tools can be adapted to up to 80% of your special single-point jobs . . . thus eliminating many costly, made-to-print tools.

"The MTI Plan will show you which 'specials' can be eliminated, and exactly how much you'll save. With the 15% price reduction on Standard Carboloy Cemented Carbide Tools, in effect since June 22, now, more than ever before, it pays to standardize."

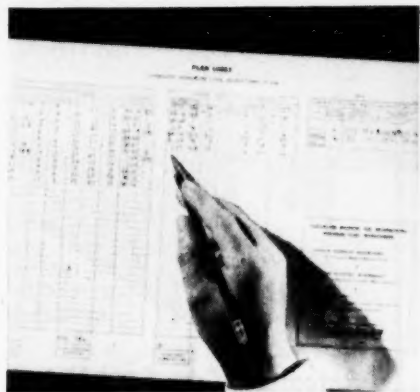
Send the coupon at right, attached to your company letterhead, for your free MTI Plan Kit. Then, determine your own benefits from the MTI Plan as follows:

1. Using the Instant Tool Selectors, you'll see at a glance how only 11 Standard Carboloy Tools can be easily and quickly adapted to handle 4 out of 5 of your special, made-to-print tool jobs.





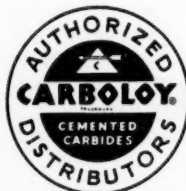
# inventories of tools now unnecessary"



**2.** With the handy Plan Sheet provided, you'll quickly get a dollars-and-cents answer showing how much you'll save by standardizing. Simple subtraction shows you how much your inventories can be cut by using standards.



**3.** Order the Standard Tools you'll need from your local Authorized Carboloy Distributor. Use them "as is," or quickly grind them to your specifications. Grinding hints, price lists and Standard Tool specifications are included in Kit.



**CARBOLOY TOOLS ARE STOCKED  
COAST TO COAST**

Look under "Tools" in the Yellow Pages of your local telephone book or in Thomas' Register for your nearby Carboloy Distributor. He has complete local stocks and services. Ask him about the MTI Plan.

"Carboloy" is the registered trademark for the products of the Carboloy Department of General Electric Company.

**Send coupon—pinned to your company letterhead—  
for your free MTI Plan Kit**

## CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11143 E. 8 Mile Street, Detroit 32, Michigan

- ☐ Please rush me, at no cost or obligation, MTI Plan Kit
- ☐ Have your sales representative call to show me the Kit, without obligation
- ☐ Send me the new, free Brief-A-Log GT-265, containing complete specifications and prices of Standard Carboloy Tools and Blanks

Name \_\_\_\_\_ Position \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

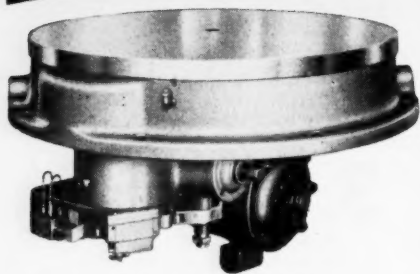


automatic cdm feed units

**Avey**

has both...

automatic index tables



### Automatic Index Tables

meet demand for Drilling and Tapping Equipment  
*Made in sizes 16", 20", 24", 30", 36" and 40" diameter. Indexes, 3 to 100 stations.*

These Index Tables are self-contained units, built on unit construction principle and includes motor drive assemblies. All drive and control mechanisms underneath table for free work surface... easy accessibility.

Send for Bulletins



### Automatic Cam Feed Units

for Drilling... Tapping... Reaming...  
Hollow Milling and Deep Hole Drilling  
*Vertical, Horizontal or Angular Mounting*

Units are universal in application... let us show you their application to your job.

Made in two sizes—No. 1 and No. 2  
Morse Taper.

This simple unit gives high production at a lower cost. When used in multiples to complete operations, no relocation of part is necessary, thus producing more accurate work.

Semi-skilled operators will deliver high production accurately and efficiently, yet with a minimum of supervision.

THE AVEY DRILLING MACHINE CO.

Chilmark, U.S.A.

**Avey**

# Here's How **SCHRADER** makes Compressed Air...

## CONVENIENT!

With Schrader Quick-Acting Couplers in air-lines along walls, benches, columns—compressed air is "plugged-in" as readily as electricity. To connect—simply push adapter into check unit . . . to disconnect, manually turn sleeve of check unit. Available in many sizes.

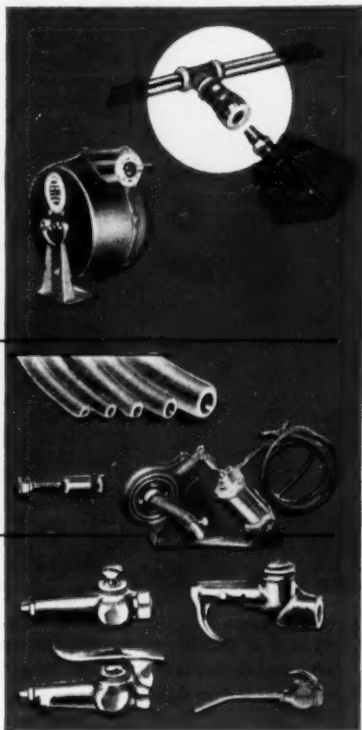
Keep idle air hose out of the way with a Schrader "Tuck-Away" Hose Reel—yet have it available at all times. Schrader Hose Reels come in several sizes with up to 50' of air hose.

## RELIABLE!

With Schrader Hose, Fittings and Ferrule Machines, you're sure of neat, attractive air circuits that will have long, useful lives. You can meet your air needs with Schrader Air Hose and Fittings.

## ECONOMICAL!

Whether your air line ends in rugged, practical Blow Guns like these—or Valves, Cylinders, Ejection Sets, Press Controls—you'll find there's a *complete Schrader Line* from which you can select the exact product to give you the maximum return on your compressed air investment.



**REMEMBER**—from air line to air tool—Schrader is one reliable source for all air control products. For further information fill out the coupon below.

# Schrader

REG. U. S. PAT. OFF.

products \_\_\_\_\_

control the air \_\_\_\_\_

**Mail This Coupon Today**

Air Cylinders • Operating Valves • Press & Shear Controls • Air Ejection Sets • Blow Guns • Air Line Couplers • Air Hose & Fittings • Hose Reels • Pressure Regulators & Oilers • Air Strainers • Hydraulic Gauges • Uniflare Tube Fittings

### A. SCHRADER'S SON

Division of Scovill Manufacturing Company, Incorporated  
461 Vanderbilt Avenue, Brooklyn 38, N. Y., Dept. G-9

Please send me my free copy of Bulletin A280.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

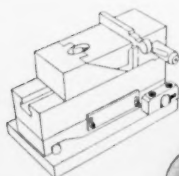
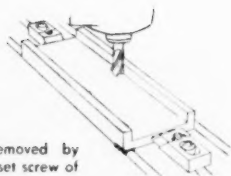
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

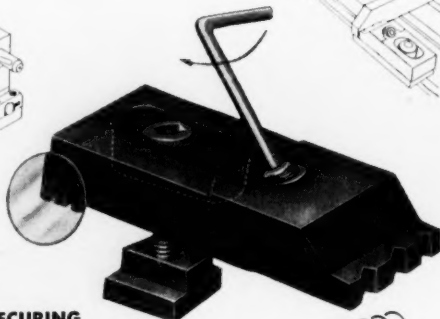
## Eliminate U-Clamps, Straps and Fingers **J & S All-Purpose JAW CLAMPS**

secure work-pieces quickly and rigidly  
easily adapted to box fixtures

Work-piece removed by  
loosening one set screw of  
one clamp only.



Precision Grinding Vise  
with or without sine bar  
allows rapid unloading  
and exact relocating.



J & S Double Half  
Vise, for use on jig  
borers, millers, plan-  
ers and shapers.

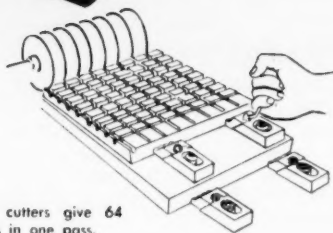
### NEW METHOD OF SECURING WORK-PIECES TO MACHINE TOOLS

for Lathes, Planers, Milling Machines, Boring  
Millers, Jig Borers, etc. (9 different types  
including new Counter Clamp)

- 1. Faster Set-up:** One adjusting screw provides a 5-ton force to position and hold the work-piece.
- 2. Stronger Grip:** The inward and downward movement of the jaw clamp at a 45° angle gives a single, powerful clamping action—easily applied and controlled.
- 3. Less Obstruction:** You can pass over the whole clamp 1" from the working surface of the machine face. No interference with reading or measuring tools.

**J & S TOOL CO., INC.**

645 W. Mt. Pleasant Ave., Livingston, N. J.  
(N. J. Highway Route No. 1C)



Eight cutters give 64  
pieces in one pass.



New home of J & S Tool Co., Inc.

**J & S  
TOOL CO. INC.**

DELIVERY FROM STOCK  
WRITE FOR NEW FOLDER!

—contains complete details on advantages,  
applications, types and sizes available.  
Booklet describing J & S "Fluidation"  
Wheel Dressers, etc. also sent on request.

**J & S**

A SPINDLE YOU  
CAN *Specify*  
WITH  
**CONFIDENCE**



THE **POPE**  
**PRECISION SPINDLE**

1 HP, 3600 RPM  
MOTORIZED

with Super Precision  
Roller Bearings  
and Separate  
Thrust Bearings

The picture shows you why this Spindle has swept the field for 6" x 18" surface grinder application (producing finer finishes at lower cost) — and why it has been promptly drafted for hundreds of other jobs.

There are many types of bearings but none can approach the superb combination of ruggedness and precision found in the double row cylindrical roller bearings you see in this Spindle. They

have tremendous load carrying capacity, produce a superior finish and assure long, trouble-free operation.

Note the thrust bearings. There is no endwise movement of the shaft in either direction.

Spindles have the Pope System of lubrication and are dynamically balanced in full assembly.

Applicable to all new grinders and to those now in service. Write for price and delivery.

No. 95

*Specify*

**POPE**

PRECISION SPINDLES

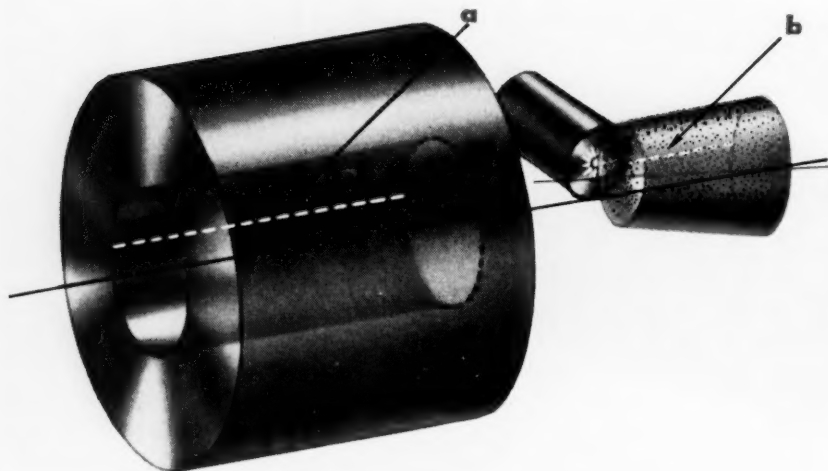
POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS

# alignment

## for better internal grinding



**GRINDING** a straight hole on an internal grinder is normally done with a straight (cylindrical) wheel. It is sometimes desirable to turn the wheelhead and dress the wheel to a taper in order to use a more rigid projection. However, this setup presents some serious obstacles which cannot be overcome unless they are clearly understood. In order to grind a straight hole the various elements of the machine must be in perfect alignment. The degree of alignment will be determined by the accuracy required on the finished part. A machine may be lined up sufficiently to produce holes within tolerance when grinding with a straight wheel, but if the wheel is turned and dressed to a taper, the alignment problem is magnified to such an extent that it may be impossible to produce holes within the same tolerance.

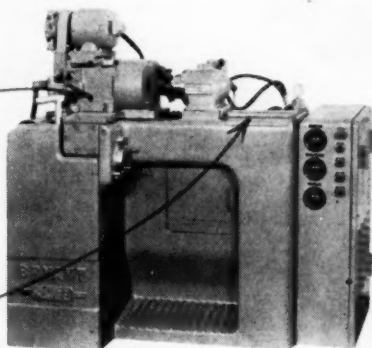
The center lines of the wheel, work and diamond must be in a common plane so that the wheel contacts the work at line "a". If the tapered wheel contacts the work above or below line "a" the wheel will touch only at its

largest diameter and, as the wheel reverses (at the left end of the hole), it will transfer its taper to the work resulting in a tight hole at the back. Turning the workhead or changing the length of traverse cannot overcome this error. Further, because of poor contact, wheel wear will be excessive and finish poor.

If the diamond is set either above or below line "b" (which is a continuation of "a") the wheel will be dressed to a curve (hyperbola) and even if the wheel contacts the work at line "a" it will be only a point contact. Again, the wheel form will be transferred to the work at the point of reversal, wheel wear will be excessive and finish poor. The proper setup calls for the work axis, wheel axis and diamond to be in a plane parallel to the longitudinal and cross motion of the machine.

Left end of workhead may be raised or lowered to bring its axis into a plane parallel with wheelslide bar.

Rear of wheelslide may be adjusted to insure straight line motion of the wheel.



The Bryant 1109 Precision Internal Grinder is a semiautomatic machine, designed especially for grinding small bores. Although intended primarily for bore diameters of less than 1", it has a chuck swing of 9° and a maximum grinding stroke of  $3\frac{1}{2}$ ". By using preloaded bar slides for both cross and longitudinal slide movements, sensitivity is obtained without loss of rigidity. These rigid slides transmit the operating load directly to the base of the machine. The Bryant Hi-Frequency Wheelhead, providing speeds up to 100,000 R.P.M., is furnished as standard equipment to assure efficient surface speeds on the wheels necessary for grinding small bores. Write for further information.

## Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

*Internal grinders • Internal & External thread gages*



*Specify Adams*

**for high quality gears  
made EXACTLY to  
your specifications**

Regardless of quantity or type, you'll profit by specifying Adams custom made gears for your product. Made on the most modern gear cutting machines by skilled workmen, Adams gears are quality controlled to guarantee exact conformance to your specifications. Write today for further information. THE ADAMS COMPANY, 1942 Cypress Street, Dubuque, Iowa.

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ESTABLISHED 1883

**FINE GEARS MADE TO  
YOUR SPECIFICATIONS**





# Now! An 18" Drill Press with the features you need!

handle the **Big** heavy jobs  
with **Small** job accuracy & speed!

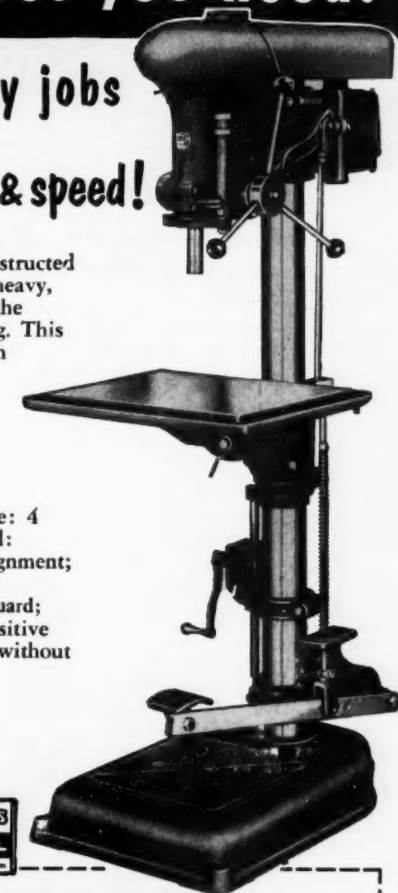
A new ruggedness and versatility has been constructed into this BIG duro 18" drill press. Massive, heavy, with a large capacity, it is built to withstand the wear and abuse of rigorous production drilling. This Duro Giant is a "performer" and handles high speed production drilling or intermittent drilling operations with equal ease, accuracy and precision.

This "modern design" drill press assures finer quality, greater reliability and longer "maintenance free" operation. Here's why: Has precision ground alloy steel spindle: 4 ball bearings sealed and permanently lubricated: precision bored bearing seats assure perfect alignment; massive close grained head casting eliminates vibration; sturdy cast hinged belt and pulley guard; easily adjustable feed tension with pin for positive positioning; table raising mechanism; with or without foot feed: plus many other features.

Model C3088-18" Drill Press  
(Illustrated) Less Motor and Switch... **\$248.00**

## WRITE FOR DETAILS!

Write today for illustrated catalog information giving full details and specifications on this Duro 18" and other Drill Presses . . . also brochure on the complete line of Duro precision engineered power tools.



### DURO METAL PRODUCTS CO.

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2665 N. KILDARE AVE. • CHICAGO 39, ILL.

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# MCCROSKY

**COST  
CUTTING  
TOOLS**

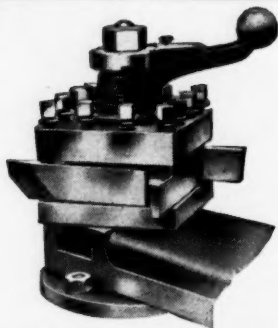
## *Turret*

### **TOOL POSTS**

give engine lathes the  
advantages of turret lathes

• The successive tools needed for multiple operation jobs can be swung into cutting position quickly — indexed accurately in any of 12 indexing positions — and locked rigidly when you use a McCrosky Turret Tool Post, giving engine lathes the advantages of specialized machines.

5 styles, including square and hexagon designs — 9 sizes — for mount-



ing in the T-slot of the compound rest, or the bolt circle of the main slide. Used by leading concerns. Endorsed by all well known lathe manufacturers. Send for Bulletin No. 17-T.

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Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.



#### **MCCROSKY *Jack-Lock*® MILLING CUTTERS**

Complete line, fitted with high speed steel, cast alloy or carbide tipped blades. Sizes from 3" to 24" to meet any requirement. Write for Bul. 17-M.



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# MCCROSKY

**TOOL  
CORPORATION**  
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

# Removes 14% more metal with **ROTOR CHIPPERS**



**T**HIS steel mill tried Rotor C-30 Powerplus Chippers for 3 months and proved their superiority by time studies which showed *14% more metal removed* from 45 to 55 carbon shell stock than with former hammers. Operators say they like them better too—they're *shorter, lighter, and they handle easier.*

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**LIGHTER** ... 1½ to 3 lbs.  
less than other chippers.

**SHORTER** ... 1" to 2" shorter  
... easier to get into  
crowded corners.

**MATCH YOUR JOB** ... Each  
basic model can be adapted  
to three kinds of work.

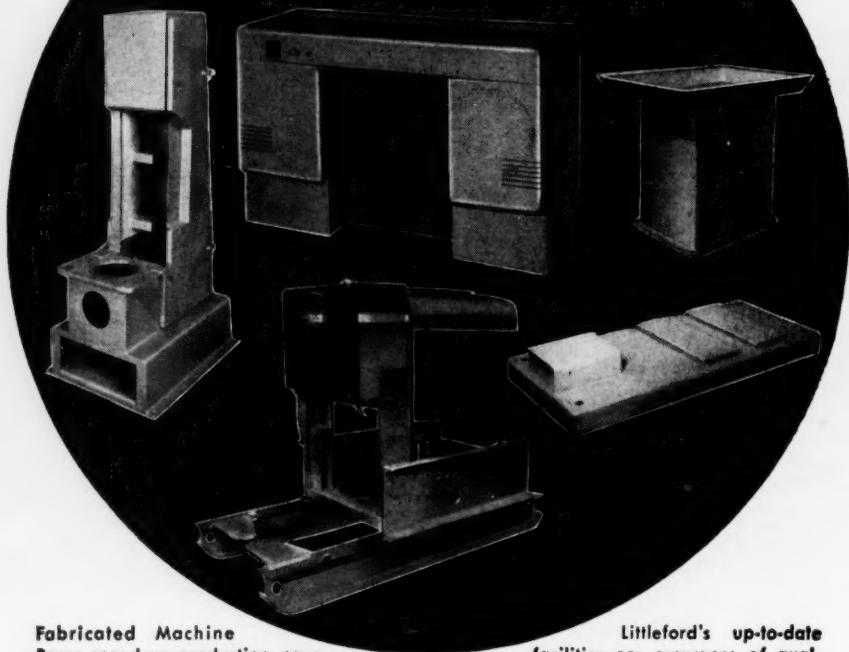
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THE **ROTOR TOOL** CO.  
CLEVELAND, OHIO

HIGH  
CYCLE

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**Fabricated Machine Bases** speed up production; save valuable man hours. Fabricated Bases eliminate machining operations, make alterations easy without expensive pattern changes. Welded Bases are stronger and lend themselves to modern design.

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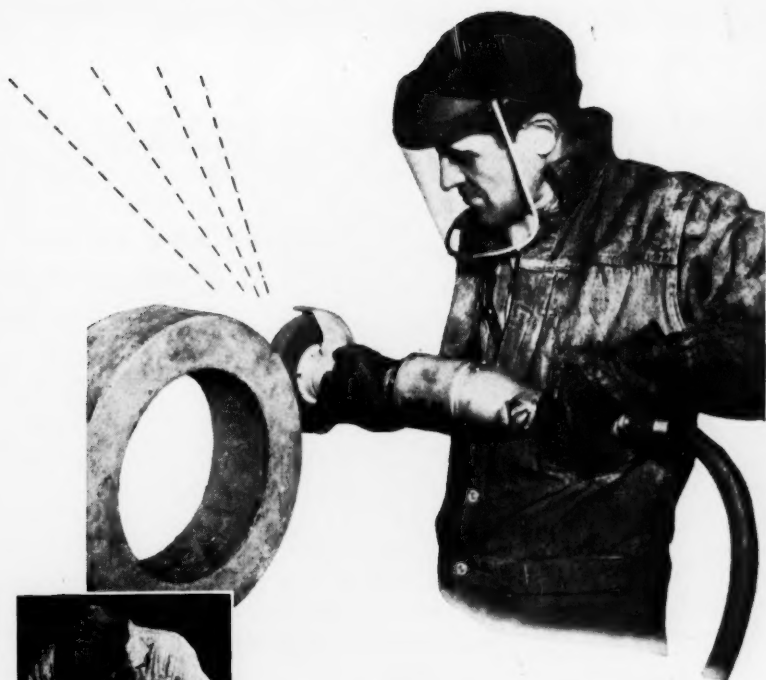
Littleford's up-to-date facilities are assurance of quality workmanship. In addition to Bases Littleford can fabricate Pans, Guards, Special Metal Parts, and Sub-assemblies to facilitate fast and accurate production. Remember there's no substitute for experience. Send blueprints today for an estimate of cost.

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PLATE AND  
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The CP Steel Clad Grinder takes the beatings of heavy industrial usage in its stride and with less maintenance. Spindle and motor housing are light weight steel clad construction for long life and operating ease. Constant speed governor and larger horsepower air motor holds wheel at most efficient cutting speed, from no load to full load, cuts grinding time—takes grind out of grinding! Available in five sizes from 4" to 8" grinders. Write for Catalogue 564.  
*Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N. Y.*



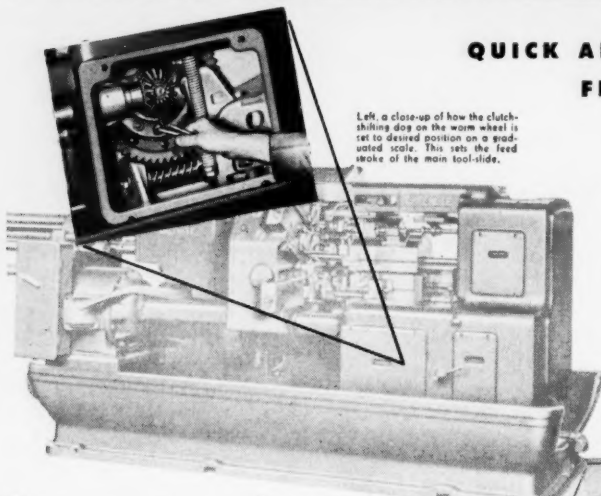
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PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES  
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

# GREENLEE

*Automatics*

## QUICK AND EASY FEED STROKE ADJUSTMENT

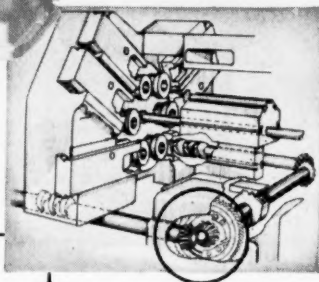


Left, a close-up of how the clutch-shifting dog on the worm wheel is set to desired position on a graduated scale. This sets the feed stroke of the main tool-slide.

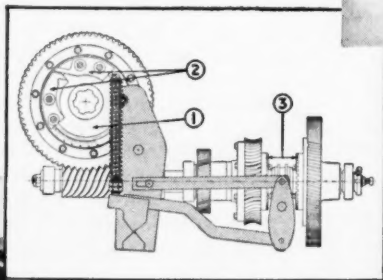
On Greenlee Automatics, main tool-slide feed stroke adjustments are made by adjusting only one dog on a graduated worm wheel, as illustrated by the inset picture at the left. The details of this arrangement, and particularly the relation of the worm wheel to the main tool-slide drive, are shown and explained in the other pictures and captions.

## *Changes can be made in 5 minutes*

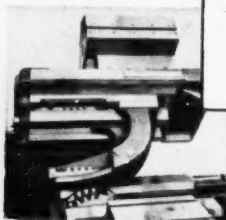
Precise adjustments of the main tool-slide stroke can be made easily in less than five minutes. To save time in making preliminary settings, two additional scales are provided, one on each side of the tool-slide, with graduations corresponding to those on the worm wheel.



The drawing at the right shows how the clutch, worm and worm wheel, and clutch shifting levers are related. Numbers indicate (1) the graduated worm wheel; (2) the clutch shifting dogs; and (3) the main drive clutch.



At the left is a view of the tool-slide removed and tilted back. The intermittent feed gear provides a full stroke each cycle, with fast approach and a smooth shift into feed. The main clutch is shifted automatically.



The cutaway diagram above shows, in the circle, the location of the graduated worm wheel on the end of the shaft that carries the intermittent feed gears.

Write for **FREE**  
Literature



PRODUCTION MACHINERY  
**GREENLEE**

GREENLEE BROS. & CO.  
1888 MASON AVE., ROCKFORD, ILL.





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● Sciaky Brothers, Inc., Chicago manufacturers of spot welding equipment, were having trouble obtaining a suitable finish on certain copper alloy parts. After they were machined, parts frequently had to be processed to remove stain or tarnish.

Upon the advice of a Standard Oil cutting oil specialist, officials of this company put a STANICUT Cutting Oil to work on the troublesome copper alloy machining jobs. It was the end for tarnish troubles. On a wide variety of operations employing many different copper alloys, STANICUT has provided

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**STANDARD OIL COMPANY**  
*(Indiana)*





**if you do ANY of these jobs . . .**

*you need this  
**jack-of  
-All-jobs . . .***

No. 7 Combination Shear,  
Punch and Coper

## *the* **Kling COMBINATION SHEAR-PUNCH-COPER**

Remember, when you were a boy, what a hit that 6- or 7-blade jack-knife made? You could do just about everything with it!

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**...an investment in speed!**



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## The Turret Milling Machine that:

1...provides a means of milling, drilling, boring and shaping combined with ability to position the milling head at angles over a wide area . . . **without changing set up.**

2...will handle a wide variety of work more economically and with greater accuracy . . . in tool room, die shop and in production.

3...has versatility and all-round handling convenience to assure productivity over maximum available machine hours.

4...can be equipped with attachments specially designed for it and when so equipped offers an outstanding range of utility . . . hence the universal acceptance and phenomenal sales records of this machine.

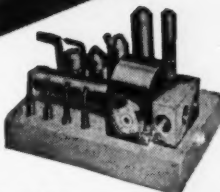
5...is within the reach of shops large and small because it is moderately priced, making highest returns possible on a reasonable investment in a truly modern machine.



Write us or your nearest dealer for further details, complete description and specifications.

### No. 2 BORING HEAD

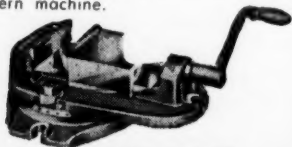
Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



### RIGHT ANGLE ATTACHMENTS

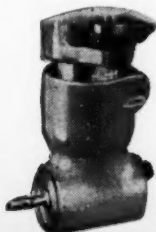
(Left) Heavy Duty... for milling and drilling at right angles. Fits both Master and 1 HP Bridgeport Heads.

(Right) Light Duty... for right angle milling and drilling narrow, deep molds and cavities.



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An improved vise providing great gripping power. Streamlined for attractiveness; equipped with coolant trough. Large diameter screw assures rigid holding. Two sizes: 5"x3 1/2" and 6"x5" jaw openings.

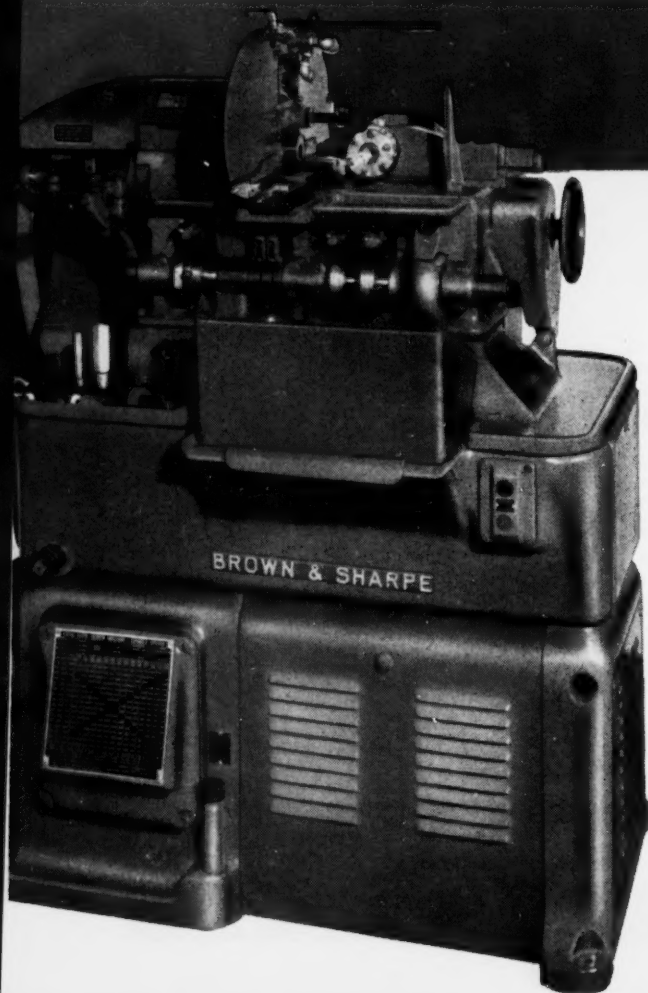


# ***Bridgeport*** MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

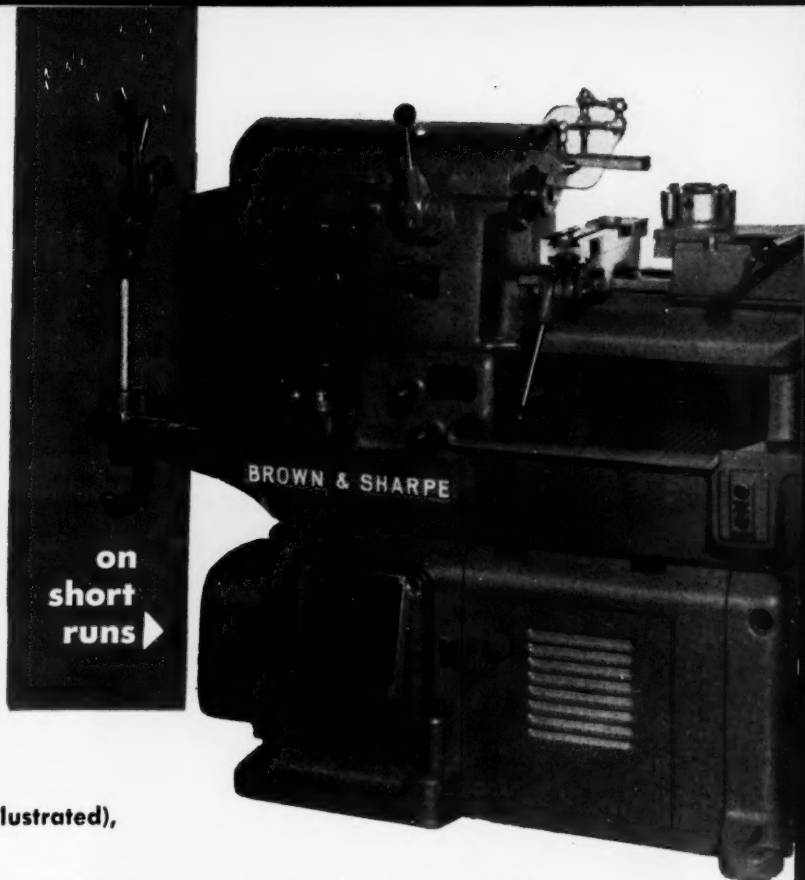
## "SPEED-UP" YOUR SCREW MACHINE DEPARTMENTS...



on  
long  
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**Automatic  
Screw Machines  
Nos. OOG (illustrated),  
OG, 2G and  
the new No. 4**

Minimum cost per piece on long and moderate runs is assured with these fast-operating Automatic Screw Machines. Rapid non-cutting movements, together with wide range of spindle speeds and speed ratios, "speed-up" each operation . . . permit top cutting efficiency on a broad variety of materials. The three smaller machines are also made in Automatic Cutting-Off type for manufacture of precision parts requiring only forming and cutting-off.



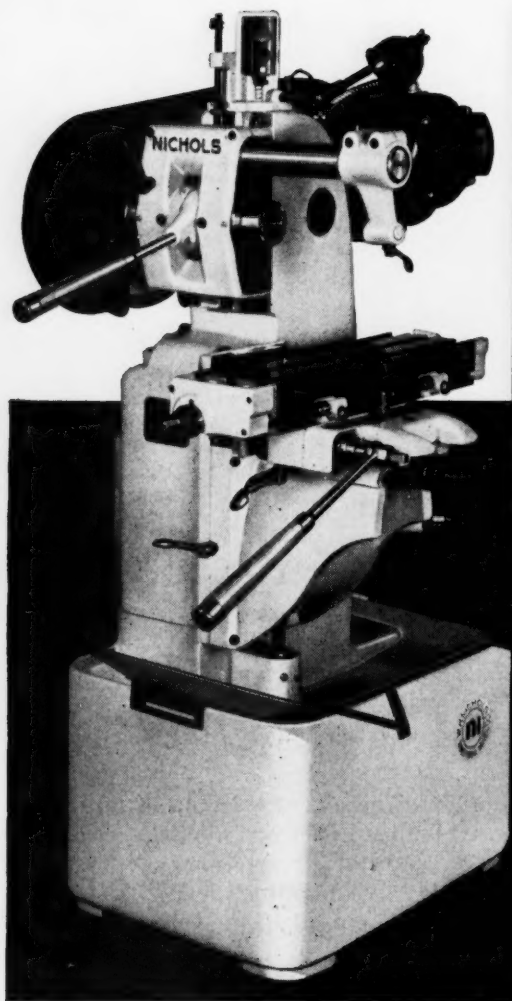
**Hand Screw  
Machines  
Nos. OO,O (illustrated),  
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Jobs of small or moderate quantities are more quickly handled on these easy-to-set-up Hand Screw Machines. They perform the same operations as automatics, but do not require cams or timing . . . make short runs and second operation work highly profitable. Tooling is economical inasmuch as they use many of the same tools, collets, and fingers as the automatics.

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The Standard Nichols Miller often proves to be the handiest (and busiest) machine in the shop. Its unusual versatility is due to the "rise and fall" spindle head—the spindle being mounted in a counter-balanced sliding head which allows the cutter to be brought to the work. This unique feature, plus conventional screw or lever movements of table, saddle and knee, guarantees fast, economical production on the widest variety of parts. And the unexcelled quality of Nichols' design and workmanship commands the respect of every owner and operator.

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Longitudinal Travel	10" or 19"
Transverse Travel	7"
Vertical Travel—Knee	13 $\frac{1}{2}$ "
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Selective Speed Ranges up to	5000 R. P. M.
Weight	1250 lbs.

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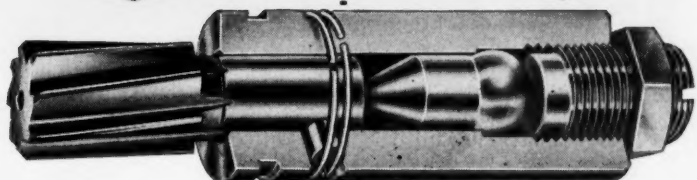
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**FAST, FREE CUTTING . . .** thanks to correct P&W design with left hand spiral cut and positive rake at the cutting edge.

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# MAGNETIC CHUCKS BY *Magna-Lock*

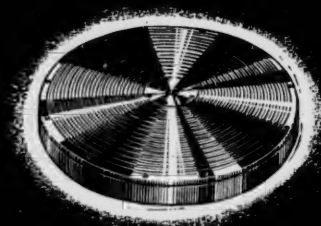
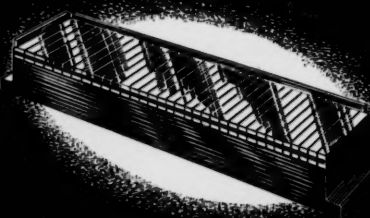
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Machine illustrated.

produces  
**2,200**  
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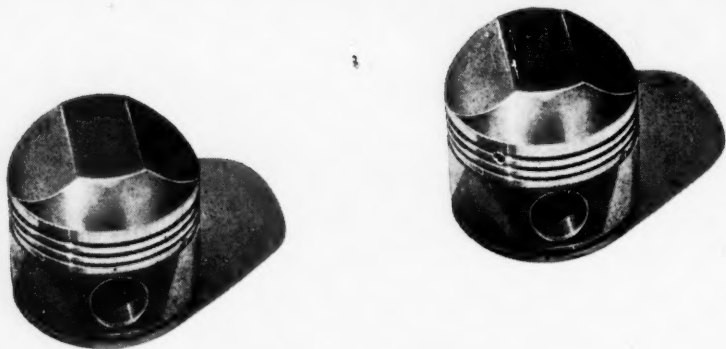


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**WHEELS, STICKS, RODS, BLOCKS,**  
for machine and  
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**Brightboy Now Available in  
6 VERSATILE TEXTURES**

**54 BL.** For faster finishing action on all metals.

**TUFF-TEX.** For finishing action on sharp burrs and edges.

**70 BL.** Wide range of finishing action on all metals.

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**120 BL.** Wide finishing range on medium-hard and soft metals; high polish on hard metals.

**FINE-TEX.** Polishing, finishing and burring soft metals; cleaning medium-hard and hard metals.

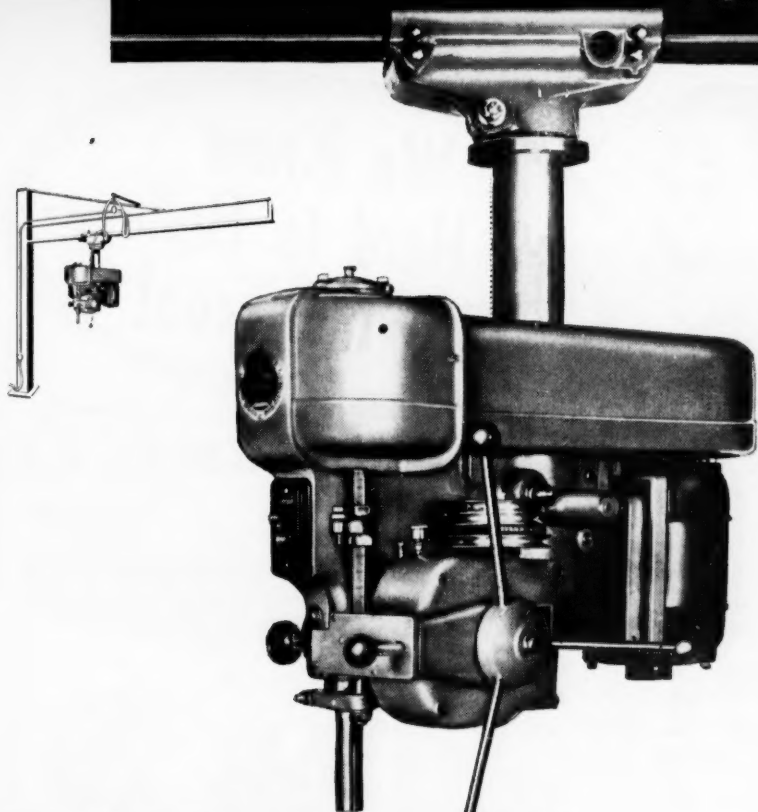
**SAVE—PROFIT**—by using the just-right, smooth-bite Brightboy texture for your job! Not until you see—and try—Brightboy's wonder-working combination of **SPECIAL-TEXTURE, CUSHIONING RUBBER** and **FORMULA-MATCHED ABRASIVE** can you conceive of its refreshing, *different* action. Take advantage of wider applications, greater time savings, than other methods.

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WELDON ROBERTS RUBBER CO.  
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*America's Pioneer Manufacturer of Rubber-Bonded Abrasives*



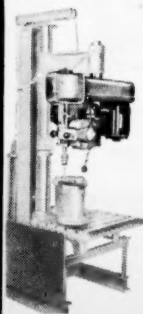
## This WALKER-TURNER • 20" OVERHEAD DRILL PRESS SET-UP saves handling time . . . cuts costs

Wherever large or heavy parts or units are to be worked, this set-up—utilizing a WALKER-TURNER DRILL HEAD with its special ball-bearing carriage traveling along a boom—can save handling time and costs . . . bring new production economies. Special set-ups like this make it possible to get WALKER-TURNER precision drilling (either hand or power feed) at surprisingly low cost.

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to write for full details and specifications.  
Walker-Turner Division, Kearney & Trecker Corp.,  
Dept. MMS, Plainfield, N. J.

(Please write your name and address in margin of page)



**We Know  
It's Hard to Believe—  
But It's True!**

**You Can Reduce Tap Costs Up to 75% with the**



Reduction of tap costs by as much as 50 to 75% — and more — is reported by leading metalworking firms using the B.P.S.\* System. Why not get the same benefits?

**HERE IS THE B.P.S.\* SYSTEM:**

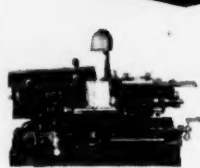
Adopt these two simple ideas: (1) Sharpen your taps at *regular, planned* intervals and (2) Sharpen flutes and chamfers of taps to an exceptionally high degree of accuracy (possible only on Blake grinders).

**HERE'S HOW THE B.P.S.\* SYSTEM CUTS YOUR COSTS:**

With the Blake Chamfer Grinder and Blake Flute Grinder, your operators can sharpen each tap precisely to correct any error in indexing and control the rake angle. Each tap then cuts much more accurately, more uniformly, with less strain — and its working life is greatly increased. Longer life, due to this superior sharpening method, gives far more service from every tap — greatly reduces tap costs!

*\*Blake Precision Sharpening*

**HERE'S WHAT THE B.P.S.\* SYSTEM CAN DO FOR YOU!**



**BLAKE CHAMFER  
GRINDER**



**BLAKE FLUTE  
GRINDER**

- Gives much more production per tap!
- Greatly reduces tap costs!
- Provides greater tap accuracy and uniformity!
- Greatly reduces tap breakage and spoiled or unacceptable work!

**INVESTIGATE THE B.P.S.\* SYSTEM NOW!**

Write us for reprints of *American Machinist* and *Machinery* articles on this subject. Descriptive folders on both Blake grinders also available.



**EDWARD BLAKE COMPANY**

438 CHERRY STREET • WEST NEWTON 65, MASS.

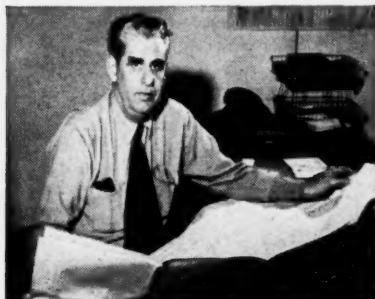


**Black Diamond Precision Drill Grinders • Waltham Cutter Sharpeners • Surface Finish Standards**

# Cutting Metal?... "SKIL Saw saves 9 hours, pays for itself on first job!"

says **Alton J. Hofstad**, manager,  
**Kolstad Co.**, Minneapolis, Minn.,  
*largest truck body builder  
in Minnesota*

"A recent order for 13 trailers required cutting corrugated aluminum," says Mr. Hofstad. "Cutting by hand was a ten-hour job. We tried a SKIL Saw Model 825 with an aluminum-cutting blade and finished in one hour. The saw paid for itself on this first job!"



"SKIL Tools outlast all others,"  
says Superintendent E. Livingston

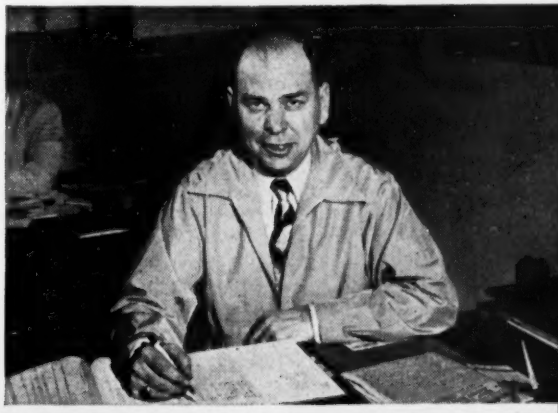
Mr. Livingston states, "I have used SKIL tools for many years and know first hand of their excellent performance, durability and the many savings they give in reduced production costs. When we started this firm, we bought SKIL tools and other makes. Hard used burned out the others, but SKIL had what it takes!"

**Phone, write or see your  
SKIL Distributor or nearby SKIL Factory  
Branch for complete information**

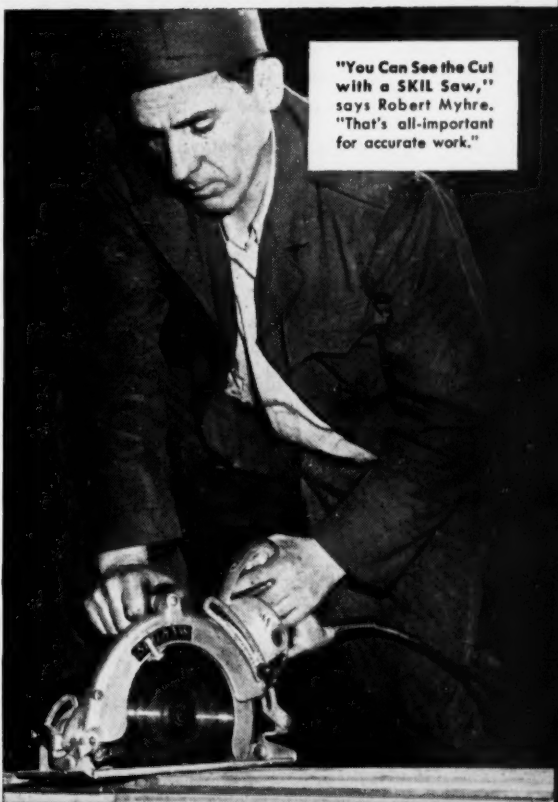
**SKIL**  
PORTABLE TOOLS

SKIL Products are made only by SKIL Corporation  
formerly SKILSAW, Inc.

5033 Elston Avenue, Chicago 30, Illinois  
3601 Dundas Street West, Toronto 9, Ontario  
Factory Branches in All Leading Cities



"You Can See the Cut  
with a SKIL Saw,"  
says Robert Myhre.  
"That's all-important  
for accurate work."





*Know - don't guess -  
the Hardness of  
your metals --- before  
and after machining*

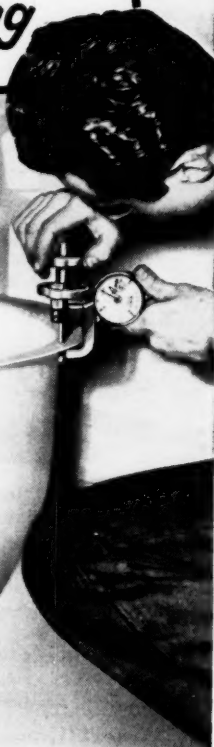
## *Ames* PORTABLE HARDNESS TESTERS

Show the exact hardness of your metals before and after heat-treating, to reduce tool wear and breakage and to speed up production.

Ames Portable Hardness Testers are light in weight and are carried to the work. Tests are easy to make and accurate, requiring no skill.

Ames Portable Testers are used to test flats, rounds, strip, tubing, wire, etc., without cutting off specimens. Saws, gears, knives and large irregular shapes are tested while assembled. Readings are direct in the Rockwell Scales.

Send today for interesting folder  
"Rockwell Hardness Testing Made Easy"



**AMES PRECISION MACHINE WORKS**  
Waltham 54, Mass., U.S.A.



# Now

## VIKING

# TRACER TOOLS

WITH

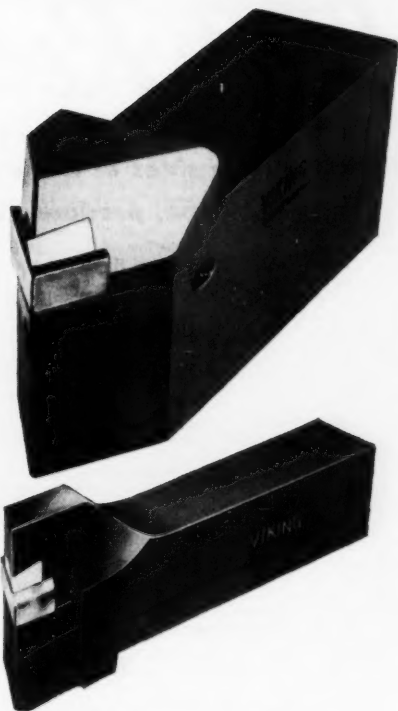
# MECHANICAL

# CHIP BREAKER!

- No Chip Breaker Grinding
- Serrated Inserted Carbide Tool Bit
- Reduces Carbide Failure—Saves Diamond Wheels



Special designs engineered to customer specifications



### CHECK THESE ADVANTAGES

1. Separate chip breaker block and tool tip simultaneously locked in tool holder with one locking device.
2. Solid carbide block provides trouble free, long life chip breaker. No chip breaker grooves to grind into the tip each time tool is sharpened.
3. "On the job" adjustment of chip breaker to control the chip to meet variations in speeds, feeds, depth of cuts, and material machined.
4. Carbide to carbide contact of chip breaker block and tool bit allows no wedging of chip under breaker to fracture the carbide.

Write for Free Bulletin

## VIKING TOOL CO., INC.

SHELTON, CONN.

INSERTED BLADE SINGLE POINT TOOLS AND MILLING CUTTERS



**SCULLY  
JONES**

# Recessing Tools

**Chamfer both sides of crankshaft bores at same time, produce 720 pieces per hour!**

Speed and simplicity get together on this special Hartford Crankshaft Bore Chamfering Machine... "factory-equipped" with Scully-Jones Type "J" Recessing Tools.

Four Recessing Tools automatically position the tool bits inside the bores, control depth of cut precisely for putting 45° chamfers on both sides of connecting rods. Production, at 85% efficiency, is 720 rods per hour!

Simplicity of tooling and extreme ease of setting depth adjustment are outstanding production advantages on this high speed chamfering job. The eccentric tool holders pilot in special Oilite bushings. Lead cams automatically actuate feed stroke. Operator merely loads the machine and pushes "start" button. Scully-Jones carbide-tipped tool bits produce eight precise chamfers on each cycle, hold sharp edges over many cuts.

Whether you're a builder or buyer of machine tools—you can reduce costs of intricate machining operations with Scully-Jones Automatic Recessing Tools. Ask your Scully-Jones representative or stocking distributor, today!

**AUTOMATIC RECESSING TOOLS** reduce cost of intricate operations, such as: cutting reliefs, machining retainer rings and oil grooves, chamfering, back-facing and counterboring, necking, boring, or a combination of these operations on standard machines.

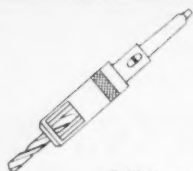
**CLOSE TOLERANCES** are assured; adjustments for location and depth of groove are simple, fast, accurate. Eccentric cam gives positive feed.

**HIGH PRODUCTION** is achieved by rapid positioning of cutting tool and split-second cutting cycle. Hence, with a convenient chucking arrangement, you get fast, low-cost production.

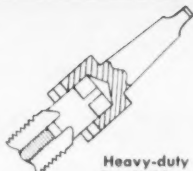


Scully-Jones Type "J" Automatic Recessing Tool. Types "J" and "C" pilot in a fixture bushing. Type "R" pilots in, and stops on work.

THERE'S A SCULLY-JONES PRECISION TOOL FOR EVERY HOLDING OR DRIVING NEED...



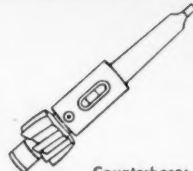
**Drill Stops**  
Stop tool on work or fixture bushing, control depth of hole precisely.



**Heavy-duty Tap Holders**  
For holding and driving large size taps. Keep tools running true.



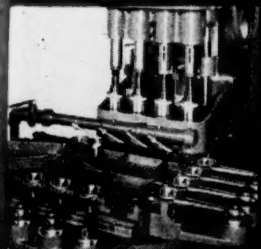
**Precision Sleeves and Sockets**  
Reduce any A.S.A. or Morse taper hole to smaller taper. Hardened and ground.



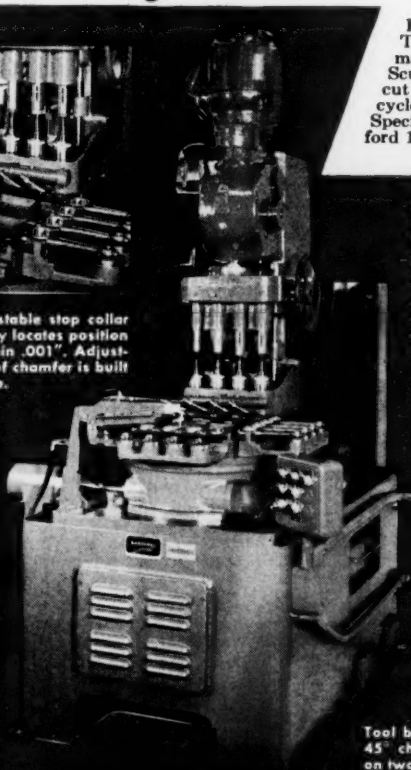
**Counterbores**  
High-speed steel or carbide-tipped cutters, with stub taper drive.

# do "inside job" for **HARTFORD**

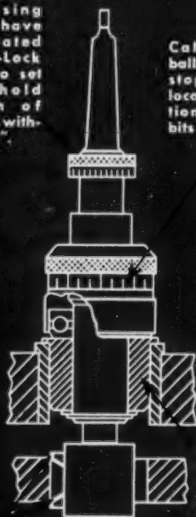
**HARTFORD Crankshaft Bore Chamfering Machine at The Studebaker Corporation machines four pieces per load. Scully-Jones Recessing Tools cut eight  $\frac{3}{4}$ " chamfers each cycle. Builder: The Hartford Special Machinery Co., Hartford 12, Connecticut.**



Calibrated adjustable stop collar assembly quickly locates position of tool bits within .001". Adjustment for depth of chamfer is built into the machine.



Standard Recessing Tools have graduated Quick-Lock Nuts to set and hold depth of groove within .001".



Calibrated ball-bearing stop collar locates position of tool bits in bore.

Tool bits cut 45° chamfer on two sides

Holder pilots in special Oilite bushing.

## **SCULLY JONES**

### *Precision Holding*

**FOR HOLDING PRECISION**

Scully-Jones and Company

1909 South Rockwell Street, Chicago 8, Illinois

**MORE FACTS**—Send for free catalog describing Scully-Jones Recessing Tools. Paste coupon to letter-head or postal card and mail today.

Gentlemen: I'm interested in learning more about Scully-Jones Precision Holding and Driving Tools.

- ☐ Send Bulletin 10-50 describing Recessing Tools.  
☐ Send catalog of your complete line.

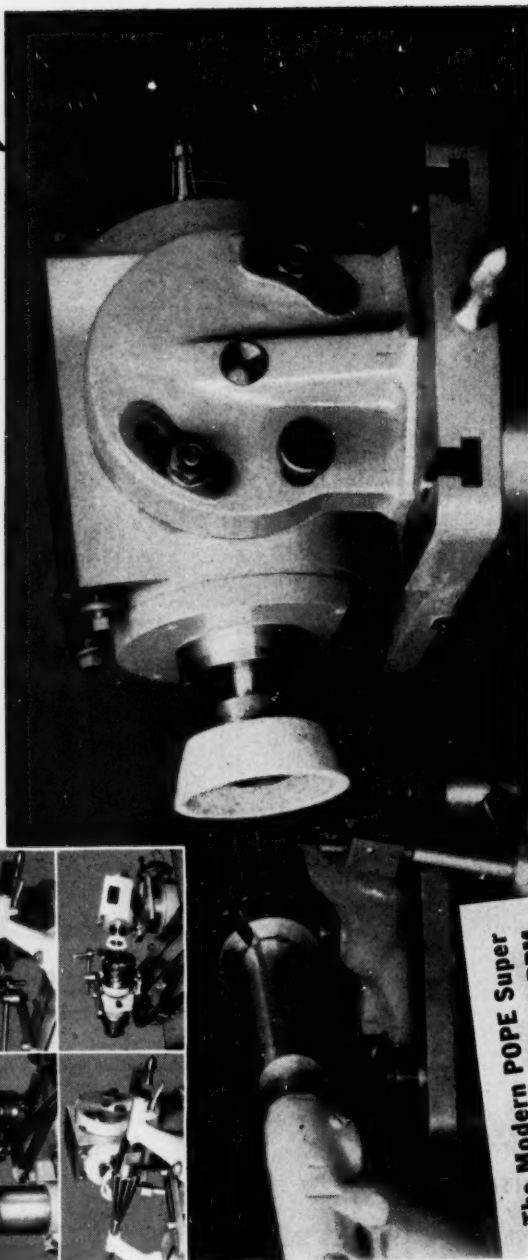
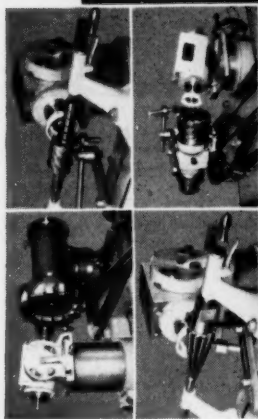
Name

Company

Address

City  State

# The TOOL GRINDER For You!



**The Modern POPE Super  
Precision 1 HP, 3600 RPM  
Motorized Tool and Cutter  
Grinder Head With**

**Angular Adjustment  
In A Vertical Plane**

This new unit is super-precision throughout... It is designed particularly for replacement of tool grinder heads which do not have the extremely useful angular adjustment in a vertical plane.

It will more than pay for itself — reduces set-up time — makes wheels cut faster — spark out quicker — produces the kind of cutting edge on your tools that stands up and cuts longer.

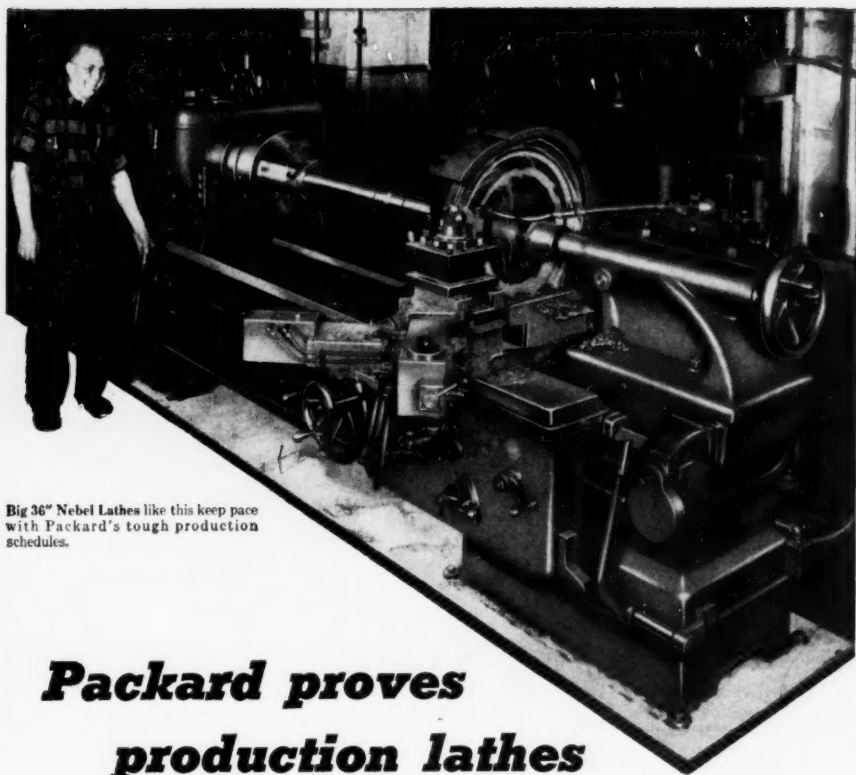
Pope Motorized Grinder Heads are available for most makes of cutter and tool grinders. Ask for quotation to cover your grinder.

No. 92

*Specify* **POPE**

PRECISION SPINDLES

**POPE MACHINE CORPORATION**  
Established 1920  
261 RIVER STREET • HAVERHILL, MASSACHUSETTS



Big 36" Nebel Lathes like this keep pace with Packard's tough production schedules.

## **Packard proves production lathes needn't be expensive!**

Packard Motor Car Co. uses 8 Nebel heavy duty engine lathes—with precisely the right combination of Nebel attachments necessary to produce jet engine turbine wheels and shafts.

Nebel lathes are like that: they're basic. They aren't loaded with expensive "extras" you may never need. Yet you can add attachments and acces-

sories you need at any time. That's why Nebel lathes—heavy duty engine, removable block gap and extension bed gap—are your very best lathe buy.

Nebel's a natural for maintenance or production. Write for descriptive catalog today. The Nebel Machine Tool Co., Cincinnati 25, Ohio, U.S.A. Members of the National Machine Tool Builders' Assn.



### **SEE WHY NEBEL'S YOUR BEST LATHE BUY!**

Powerful 20-page booklet tells you how a lathe can be so good and yet cost so little. It's yours without obligation. Send for it today.



# Nebel

*the workhorse of the  
metal-working shop since 1899*

## DRILL HEADS

# Expertly Designed

to Fit YOUR Needs For...

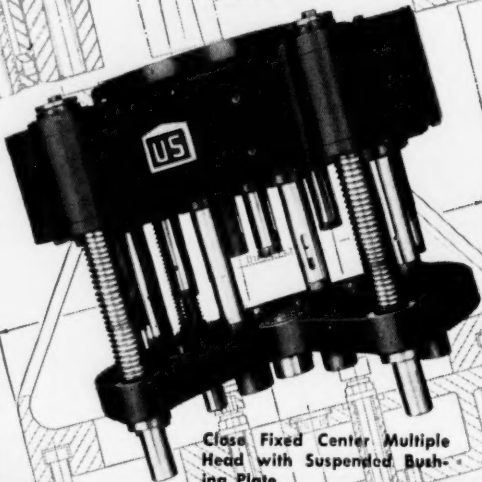
**DRILLING • TAPPING •  
SPOTFACING • REAMING  
BORING**



Fixed Center Oil Circulating Spindle Head with Vertical Adjustment Spindles. Designed mainly for high speeds.

Standard Fixed Center Construction. Bushed Guide Rod Holes and Lifter Rod Holes with Vertical Adjustment Spindles.

We manufacture, at lowest possible price, all types of multiple spindle fixed center adjustable and lead screw tapping heads.



Close Fixed Center Multiple Head with Suspended Bushing Plate.



**UNITED STATES DRILL HEAD CO. • CINCINNATI 4, OHIO**

# JOHNSON'S WAX-DRAW 'HUGS' METALS

*New wax lubricant stays with metals at high  
heats (450° F.) and pressures (200,000 P.S.I.)*



The wax molecules in Wax-Draw are charged, like tiny elongated bar magnets. Each of these polar wax molecules clings with "great tenacity" to metals, stays put, continues to lubricate, thus making possible cleaner, smoother draws on all jobs.



## Eliminates breakage in tough draw

Johnson's Wax-Draw is the only lubricant to be used successfully on this forming job at General Metal Products, St. Louis. With other lubricants the job was impossible because of very high breakage. With Wax-Draw there is practically no breakage... and the job has been running for 1½ years.

The blank for this top for an oil burning heater is 19¾" x 37¾" .0359 cold rolled steel.

Smooth, gall-free surfaces with any type of metal... perfectly formed angles, corners, curves... multiple draws without reapplication... press pressures frequently reduced and pad pressures increased where desired... reduced work hardening. Applied conventionally, Wax-Draw can be removed easily.

Test Wax-Cool...water-soluble wax coolant  
Test Wax-Cut...wax-type cutting oil



*Contact your local Johnson distributor for an on-the-job test, or write to:*

Industrial Products Dept. MMS-8  
S. C. Johnson & Son, Inc.  
Racine, Wisconsin





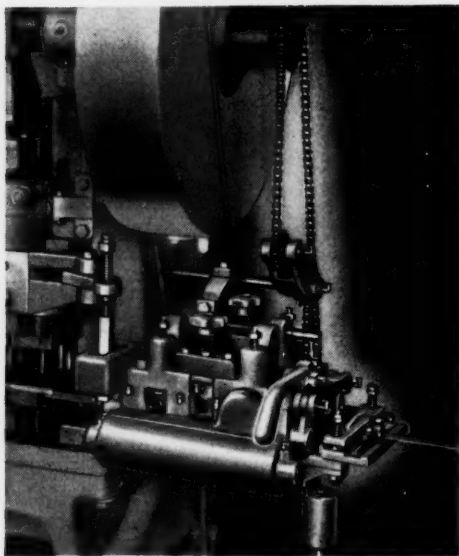
**RAPID-FIRE PRODUCTION**

*from your PUNCH PRESSES*

**IT'S EASY WITH**

**WITTEK**

**Automatic Roll Feeds**



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

## **WITTEK Reel Stands**

### **Simplify Handling of Coiled Stock**

A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

*Write for full particulars*

**WITTEK Manufacturing Co.**

4322 W. 24th Place, Chicago 23, Illinois

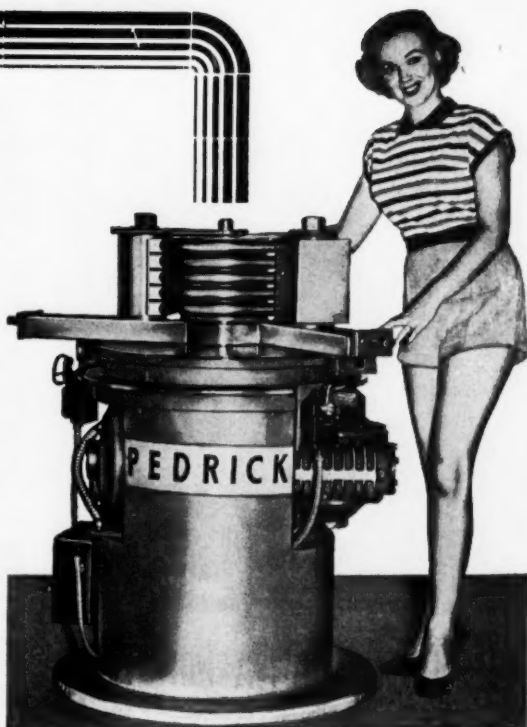
*Automatic*  
ROLL FEEDS AND  
REEL STANDS





## **MULTIPLE BENDING SAVES DOLLARS**

Here is a Pedrick Production Bender producing five identical frames simultaneously. These savings can be yours too with a Pedrick Bender. Multiple bending is adaptable to almost all bending operations, including pipe, tube, reinforcing bars or structural shapes. Smaller and larger machines available.



**WRITE FOR  
DESCRIPTIVE  
FOLDER  
DEPT. 5**

**PEDRICK  
TOOL AND  
MACHINE  
COMPANY**

**3640 N. Lawrence St.  
Philadelphia 40, Pa.  
U.S.A.**



## NO BIGGER THAN A MINUTE

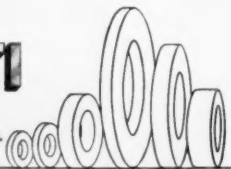
The tiny grinding grit is the start of an entirely new approach to grinding wheels. Years of research by Cincinnati Milling has confirmed that the grinding process is a true metal cutting process.

Here is the starting point of development of the grinding wheel as a true cutting tool. Cincinnati Milling has developed and tested CINCINNATI GRINDING WHEELS over a period of several years as true cutting tools forming true chips.

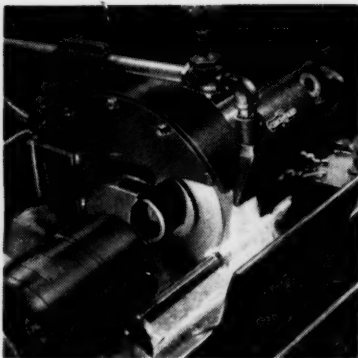
Available to you is a field organization of trained machinists who know grinding and grinding machines as well as grinding wheels. For a demonstration on your own machines of how to get the most out of CINCINNATI GRINDING WHEELS, write, wire or phone Cincinnati Milling Products Division, The Cincinnati Milling Machine Co. Or, if you prefer, write for the free booklet "A New Concept In Grinding Wheels."

**CINCINNATI**  
*Grinding Wheels*

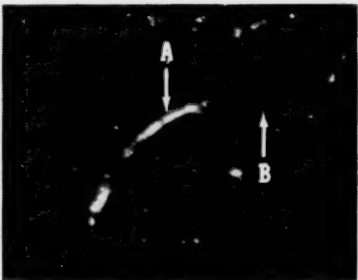
THE CINCINNATI MILLING MACHINE CO.  
Cincinnati 9, Ohio



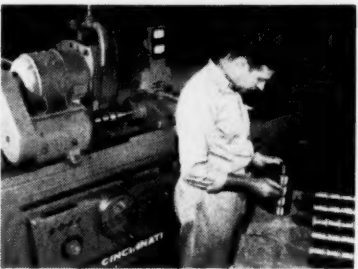
◀ **TINY GRINDING GRITS**—so small they will fit within the space marking one minute on the face of a small watch—are start of entirely new concept that led to Cincinnati Grinding Wheels.



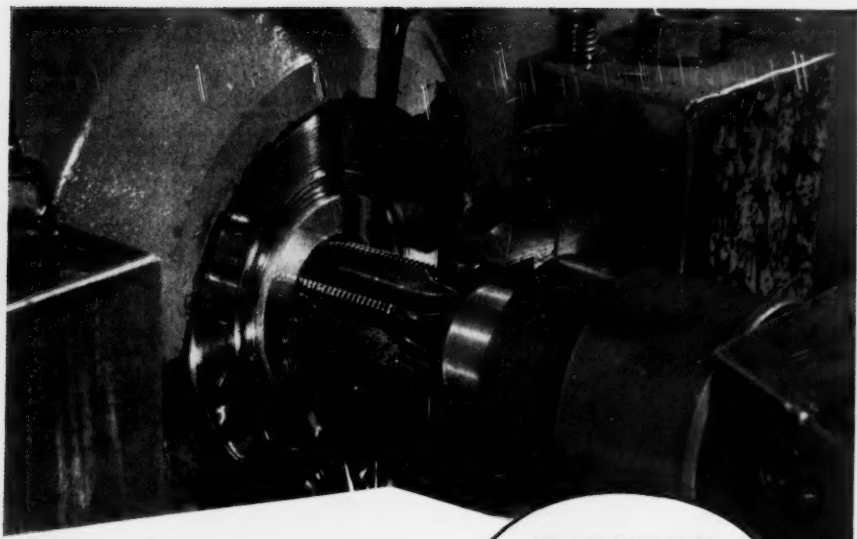
**RESEARCH GRINDING** problems have ranged from the grinding of surgical sutures .004" in diameter to steel mill rolls 60" in diameter.



**GROUND SURFACE OF SAE 3145 steel** showing partially formed chip (A) and groove (B) in workpiece from which material of chip was removed.



**SPECIAL WORKPIECES** shown in picture above, are used by machinist of the research department to compare wheel performance on a centertype grinder.



# Doing a Tough Job Well

for The Chicago Screw Company

## BESLY TAPS

**HERE** you see a C-1018 high carbon steel nut being threaded by a Besly  $1\frac{3}{4}$ " —12 tap. Highly abrasive because it has been carburized and heat treated, the material is hard on taps. For this reason, The Chicago Screw Company chose Besly Taps . . . the line of taps that *has proven* it can "take it" on the toughest of jobs.

**LET US PROVE** that Besly can help you get better threaded parts, longer tap life and lower tapping costs on *your* tough jobs. Ask us or your authorized Besly distributor for a **FREE TRIAL RUN** on your toughest jobs . . . **PLUS** details on Besly's Super-Service on "Specials".



**BESLY-WELLES  
CORPORATION**

Established as Charles H. Besly and Company in 1875  
108 Dearborn Avenue, Beloit, Wisconsin

BESLY Drills, Reamers and End Mills . . . High Speed Cutting  
Tools in a complete range of types and sizes.

UNSURPASSED ACCURACY  
AT EVERY VITAL POINT



Microcentric CHAMFER



Accurate RAKE ANGLE



Solid-Ground THREAD FORM



Mirror-finish FLUTES



Tru-Square DRIVER

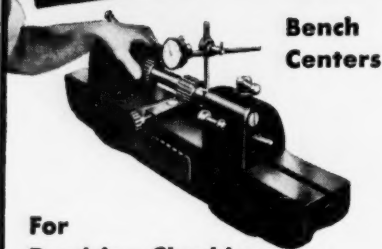
**TAP  
TIPS**

The handy "Handbook for Tap Users" is full of information on tapping methods and tap selection. **WRITE FOR YOUR FREE COPY.**



# Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



**Bench  
Centers**

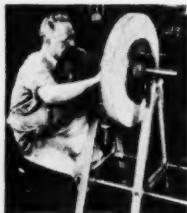
## For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

### COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

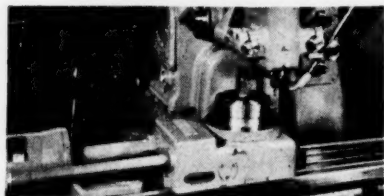
## Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

## Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

## Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 535.

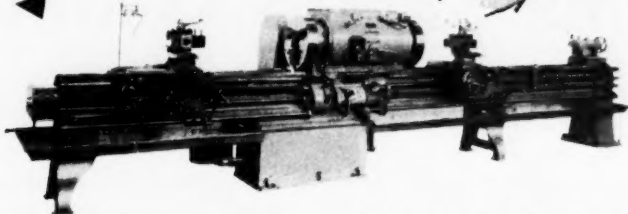


**SUNDSTRAND MACHINE TOOL CO.**

2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

WORK FROM  
*Both Ends* with...  
**LEHMANN**  
**LARGE HOLE**  
**DOUBLE-ENDER**  
**HYDRATROL LATHES**

18" x 13 foot x 6 foot Double-End Hydratrol, hollow spindle, Engine Lathe; with 7 1/8" hole in spindle; having hardened ways and a 10" long spindle extension. Equipped with carriages on both beds. Arranged for power feed and thread cutting. Tailstock for additional work between centers.



Double-End Hydratrol Lathes are built in sizes from 18" with holes up to 7 1/8" to larger sizes with holes to suit the job. Double-End operations avoid necessity for resetting the work, and insure relative concentricity of boring and turning operations and squareness of faces at both ends.

50" swing—50 foot length, 19" hole in spindle. 24" Hexagon Turret on carriage with profile bar for profile boring and grinding. Retractable diamond profile wheel dresser. Weight 72,000 lbs.

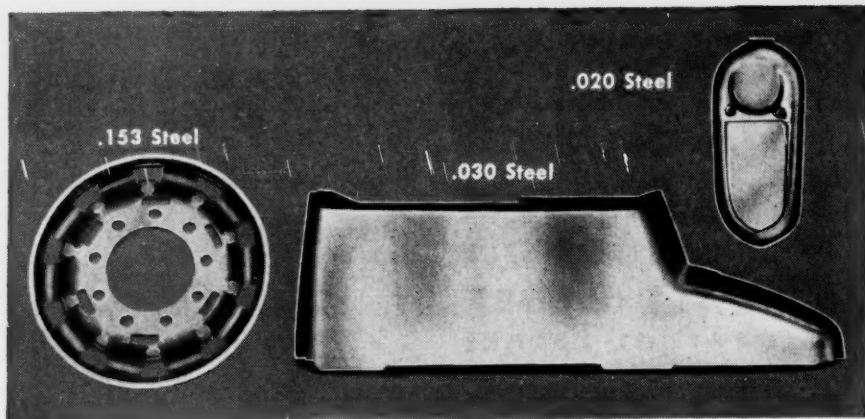


**LEHMANN**  
**MACHINE COMPANY**

GRAND at CHOUTEAU • ST. LOUIS 3, MO.

DIVISION OF NOVO ENGINE CO.

Boring Tools  
 by Lehmann



# TRIMS SHELLS COMPLETE

## *Assures Clean, Flat Edges*

Slow, costly, multiple "horn" operations, and distorted edges due to "pinch" trimming can be eliminated by a Brehm Die. Operating on principles different than ordinary trimming methods, the Brehm "Shimmy" Die with angular cams causes the shearing edges to cut *four ways* in a *single* press stroke.

Materials, thickness, shapes and sizes look alike to a Brehm "Shimmy" Die. Whether it's stainless or mild steel, copper, brass, zinc, gold, fiber, silver, aluminum, rubber or plastic, Brehm users are assured of precise production

results. Shapes can vary widely, whether a watch case, artillery case, refrigerator door, automotive or aircraft part. Clean, flat, burr free edges are assured. Edge contours can be straight or curved, with multiple notches and projections.

When model changes alter the part design, or if you wish to handle an entirely new part, you only need to substitute cutting adapters.

Write today . . . for a free catalog. Find out what a Brehm "Shimmy" Die can do—submit blueprints, or the part for full information or quotation.



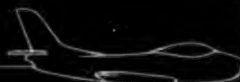
# **Brehm**

## **TRIMMING DIES**





# Prominent in the Jet Engine Program



1.0003  
1.0000



**"PACKAGED PRECISION"**

**NEEDS NO WIRES,  
HOSE, ELECTRONIC  
GEAR OR  
HEAVY BASE**

# COMTORPLUG

**FOR GAGING HIGH-PRECISION HOLES**

**REQUEST NEW BULLETIN NO. 46**

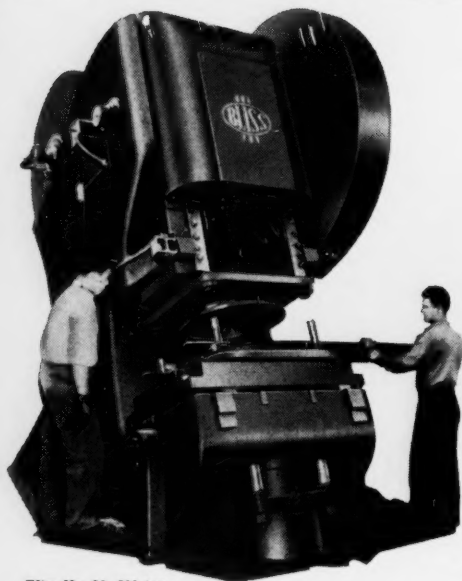
**COMTOR CO. 64 FARWELL ST., WALTHAM 54, MASS.**

Barwood & Company 2127 North 10th St. Philadelphia 32, Pa.	Gerald B. Duff & Co. 68 Clinton Ave. Newark 3, N. J.	Francis D. Montfeglon 901 East Jefferson Ave. Detroit 14, Michigan	Proctor & Martin Co., Inc. 257 Franklin Street Boston, Mass.	Harold E. Sundberg Elliot Square Buffalo 3, New York	Conner Tool & Engineering Co. 347 West 167th Street Chicago 24, Illinois
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					Garhart W. Cooke 4768 East Olympic Blvd. Los Angeles 22, California

Engineering Sales Company, 112 Purwood St., Houston Tex. — 1905 South Harwood, Dallas Tex.



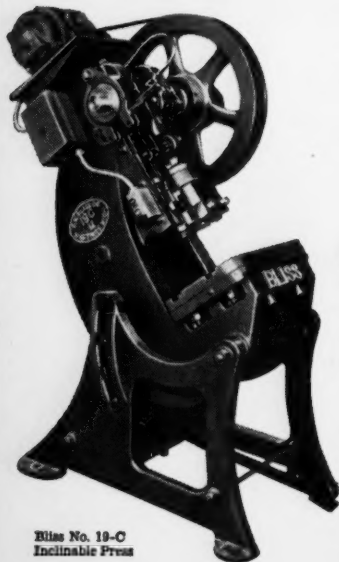
# 9 reasons why Bliss Inclinable



Bliss No. 30, 200-ton  
Enclosed Inclinable Press



Rails and ties for Lionel electric toy trains are assembled at the rate of 1250 per hour in this Bliss No. 21 Inclinable Press with 48", 8-Station Bliss dial feed and a staking die.



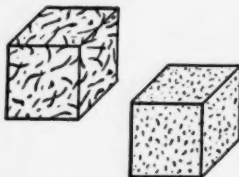
Bliss No. 19-C  
Inclinable Press

You have only to look "inside" a Bliss Inclinable Press to see where it gets its *ruggedness* and almost indestructible *precision*. Why it delivers consistent, uninterrupted performance over the entire range of press operations from blanking to drawing. Why it's the most-specified inclinable press among stamping shops and fabricators, with over 50,000 in use throughout industry.

Let's take a Bliss Inclinable apart pictorially and examine the physical reasons for its ruggedness and precision...whether it be a 10-ton or 200-ton press out of Bliss' range of standard sizes.

1

## FRAME



Strong and durable press frames of high tensile Meehanite castings are produced under rigidly controlled foundry practices. These three-dimensional drawings show the distribution of graphite in ordinary cast-iron (left) as compared with controlled graphite structure of Meehanite casting (right) used in Bliss presses.

2

## CLUTCH



Often described as the finest positive clutch available on any press, Bliss patented Rolling Key Clutch is standard feature of Bliss Inclines up to 5 1/2" shaft. Note location of clutch keys near shaft center. This means slower-moving points of engagement, faster operating speeds, less shock during intermittent operation and longer life to all moving parts. Bliss Inclines can also be equipped with air-operated friction clutch, which is standard for presses of 6" shaft diameter or larger.

# Presses outsell all other makes

## 3 CONNECTIONS

Another feature is solid, plug-clamp connection strap, which gives full 360° bearing against slide adjusting screw. This arrangement also permits using V-thread on screw, making replacement easy.



## 4 SLIDE ASSEMBLY

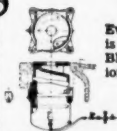


Slides are accurately gibbed to insure precise registry of die and punch. Ball seat is renewable, as are split bronze ball-cap bushings and laminated shim against which ball-cap is brought down by four bolts to give correct clearance for proper lubrication and fit. All parts are machined to close tolerances for interchangeability. For a fraction of the cost of a new slide, you can recondition the ball seat bearing.

## 5 BEARINGS, WAYS AND GIBS

Main shaft bearings and connection bearings are bronze bushed. Roller Bearings are standard for drive shaft bearings on large geared presses. All wearing surfaces are especially finished to insure long life.

## 6 CUSHIONS

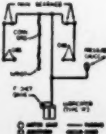


Every Bliss Inclinable Press is designed to accommodate Bliss Marquette die cushions which extend the press application to drawing operations on medium gauge metal.

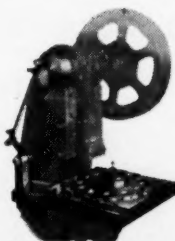
Many Bliss cushions are supplied for presses that have been in use for years. Placing the responsibility for efficient press and cushion operation with Bliss assures you of the utmost in satisfactory performance.

## 7 LUBRICATION

Bliss Inclinales have floor-line lubrication systems with oil or grease fittings at main points of moving contact. All standard Bliss Inclinaire frames are machined to take Bijur one-shot pressure system.



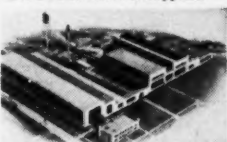
## 8 FEEDS



Bliss Inclinaire Presses are designed to take any type of Bliss automatic or semi-automatic feed. Addition of a few extra parts to the regular constant tension brake will convert it to an automatic releasing brake for continuous operation with roll, dial or magazine feeds. Every Bliss feed is engineered to specific requirements yet a large variety of standard designs is available. A Bliss feed on a Bliss press means the finest equipment that money can buy, plus a single responsibility for efficient performance of entire unit.

## 9 SERVICE

All replacement parts and service orders carry top priority at Bliss to reduce your press "down time." Supplying service parts for presses more than 50 years old is routine at Bliss. Accurate-fitting parts are supplied from stock by virtue of precision manufacturing methods which guarantee interchangeability. A large sales and service organization is available. Incidentally, one effective way of preventing costly shutdowns is to call for a Bliss service inspection of your Bliss presses. A highly competent maintenance man will call on you and the chances are that he will spot trouble before it happens.



The Bliss plant at Hastings, Michigan is specially equipped for quantity production of parts for Inclinaire Presses.

These are the reasons—plus the fact that *they are priced right*—that are most often reported by the trade for its preference of Bliss presses.

If your pressed-metal production calls for inclinable presses, you're sure to find the specific answer among Bliss' standard sizes. And a Bliss sales engineer will be on hand to give you unbiased counsel. Remember too, "BLISS" on your press is more than a name...it's a guarantee!

**Write today for catalog 2-C illustrating the new Bliss Inclinaire Presses and Service Sheet A-110 giving operating and maintenance instructions for the complete line.**

**E. W. BLISS COMPANY, CANTON, OHIO**

**E. W. Bliss (England) Ltd., Derby, England**

**E. W. Bliss Company (Paris), St. Ouen sur Seine, France**

U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan. Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

for Presses,  
Rolling Mills,  
Special Machinery

# BLISS

**TOOL ROOM OR PRODUCTION—  
SPEEDS FOR CARBIDE TOOLS—**

**MEDIUM SIZE CAPACITY—**



*With* **FEATURES AND RANGE  
NORMALLY FOUND IN LARGER LATHES**

Usually only in larger, more costly machines do you find the combination of speeds, swing, power, feeds and threads that are standard equipment on Rockford Economy Lathes. These features make it possible to machine a wider range of work with fewer non-productive hours than is possible with many machines in its class.

Medium-sized and economy-priced, it's built to handle any job that can be turned or threaded within 16-1/2" or 18-1/2" swing, and 30" to 102" center distance. 3100 lbs. of weight, 6' bed and zero precision bearings furnish the rigidity and precision for turning out tool room accuracy.

Ask a Rockford Machine Tool Co. representative to give you full details on these machines, or write direct for our new bulletin No. 900G.

**MEDIUM-SIZED**

**ECONOMY-PRICED**

**ROCKFORD ECONOMY LATHES—16" and 18"**

**ROCKFORD MACHINE TOOL CO.**  
2500 Kishwaukee Street, Rockford, Illinois



## COLD FACTS about the HOTTEST IDEA in the history of coolants...

CIMCOOL® is a radically new and different cutting fluid that lowers costs . . . permits faster speeds . . . increases accuracy . . . helps increase tool life . . . and covers 85% of all metal cutting jobs!

Cimcool is freezing out old-fashioned coolants in more and more plants every day because it's a *chemical emulsion*. It replaces all water emulsions and all but a few highly compounded specialty oils. Cimcool permits faster speeds and increases tool life because it combines friction reduction and cooling capacity in a degree never before attained. It's longer lasting in machines. So Cimcool

reduces downtime and cuts labor costs for cleaning and changing.

For a demonstration, write us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

®Trade Mark Reg. U.S. Pat. Off.

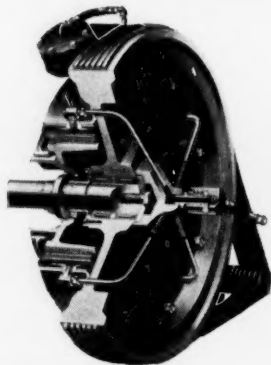
# CIMCOOL

for **85%**  
of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

## FOR TOP PRESS PERFORMANCE

The Press-Rite Airflex Air Friction Clutch and Brake is designed to give peak production and long, maintenance-free use. Needs no adjustment for wear. This greatest single improvement in power presses is now available for 20 to 85 ton capacity Press-Rite Presses.



Available in 9 standard models from 5 to 85 ton capacities.

Write Today . . . for your FREE copy of the new Press-Rite bulletin detailing our complete line. You owe it to yourself to have this information.

**PRESS-RITE**  
**POWER PRESS**

No finer presses on the market . . . Press-Rite Presses are built for high speed operation on long production runs . . . give you maximum economy too.

Outstanding safety features, simplicity of operation, rugged dependability, triple ramway lubrication, and many other proven advantages make Press-Rite Presses the choice of leading manufacturers everywhere.

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# **RUSNOK** MILL HEADS

## **1/4 H. P. CONVERTICAL MILL HEAD**

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1 1/2" to 3".

3/8" end mill capacity.



## **1/2 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

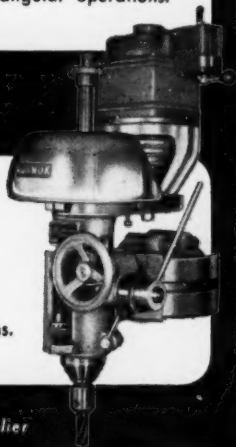
## **1 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.



WRITE for complete details and give name of your supplier

**RUSNOK** RUSNOK TOOL WORKS, 4840 W. North Ave., Chicago 39, Ill.  
**MILLING • DRILLING • BORING**





CINCINNATI


296 INCHES

Material: 3/16" mild steel.  
Maximum number of holes: 104.  
Maximum diameter of hole: 1-3/16"



# PUNCHING

104 holes every  
10 seconds  
*accurately*



The multiple punching of these holes must be very rapid, and their location as well as spacing must be held accurately.

The assembly of these 24' trailer frames is smooth and economical with no costly hand fitting.

With this punching equipment, position, size and spacing of holes may be changed quickly and at low cost.

The Brake can perform many other operations as desired . . . converting from one operation to another quickly and at low cost.

Write for the New comprehensive Catalog B-4.

Photo—Courtesy, Youngstown Steel Car Corporation

## THE CINCINNATI SHAPER CO.

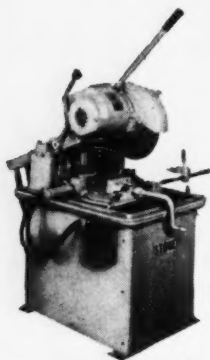
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



**You Can Cut All Metals At Less Than**

**4 SEC. Per Square Inch**



**MODEL M-75  
HEAVY DUTY**

For continuous production cutting of solids up to 2½" — pipe and structurals up to 4". Equipped with full 7½ h.p. geared-in-head motor engineered with positive drive for 33% greater efficiency.

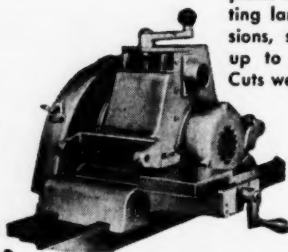
**LOOK AT  
THESE  
TYPICAL  
CUTTING  
TIMES**

CARBON STEEL	1" Dia.	3 Seconds
CARBON STEEL	1½" Dia.	6 Seconds
COLD ROLLED STEEL	2½" Dia.	15 Seconds
HIGH SPEED STEEL	2" Dia.	9 Seconds
CHANNEL	4"	6 Seconds
STEEL PIPE	2" O.D.	3 Seconds
ANGLE IRON	3x3x¼"	5 Seconds

**MODELS AVAILABLE  
FOR ALL SHOP NEEDS**

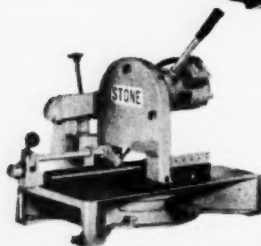
**MODEL SS-20  
TRAVERSE TYPE**

Operates in horizontal plane on guided rails for cutting larger structurals, extrusions, sheet, plate with cuts up to nine feet in length. Cuts wet or dry.



**MODEL M-14**

Low cost machine for cutting solids up to 2" — pipe and structurals up to 2½". Two models — straight cut-off and swivel head for angle cutting to 45°. Bench or floor model. Equipped with full 3½ h.p. geared-in-head motor engineered with positive drive.



**STONE MACHINERY Co., Inc.**

**410 Fayette St., Manlius, N. Y.**

**Write Today For  
Complete  
Information**

**On These Machines**

# JIG GRINDING ACCURACY *guaranteed\**



## INFINITE CONTROLLED SPEEDS 30,000 TO 65,000 R. P. M.

### *Easily connect jig grinder to jig borer or mill*

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

*\*Dependably accurate to "tenths"*

### *Other infinitely controlled air driven spindle applications*

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

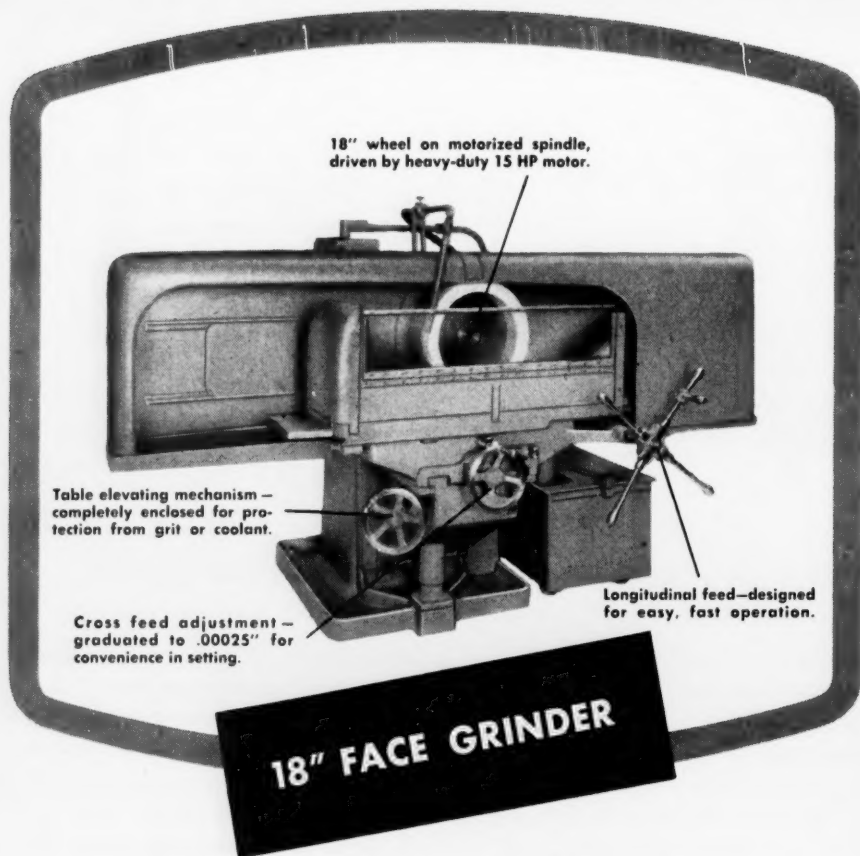
Advantages—10 micro finishes using carbide mills . . . 5 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 $\frac{3}{4}$ " long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs.

VULCAN TOOL CO., Pritz and Highland, Dayton 10, Ohio

***Vulcanaire***  
It's built by toolmakers for toolmakers





18" wheel on motorized spindle,  
driven by heavy-duty 15 HP motor.

Table elevating mechanism—  
completely enclosed for pro-  
tection from grit or coolant.

Cross feed adjustment—  
graduated to .00025" for  
convenience in setting.

Longitudinal feed—designed  
for easy, fast operation.

## 18" FACE GRINDER

### Quick Set-up Speeds Production

The Abrasive 18" Face Grinder handles big work, odd shapes and special fixtures—gets out grinding jobs fast and efficiently. By removing the Plexiglas guard, the 13" x 36" work table is completely "in the open"—fully accessible for fast, easy set-up. Transverse and vertical adjustments are by large, conveniently located handwheels.

Longitudinal hand feed also saves set-up

time and eliminates table overrun.

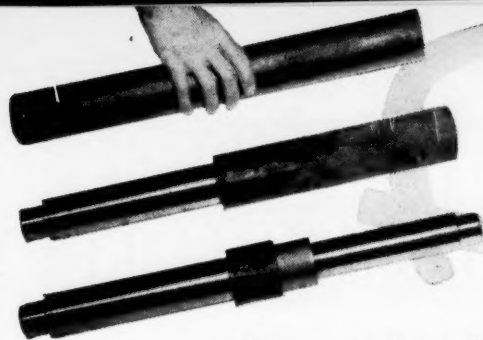
Abrasive 18" Face Grinder has many uses—faces off castings, grinds automobile dies, squares up die blocks, snags castings, does many other jobs where flat, square surfaces are required.

Write for complete details and catalog. Abrasive Machine Tool Company, 20 Dunellen Road, East Providence 14, Rhode Island.

**ABRASIVE**

ACCURACY BOOSTS PRODUCTION

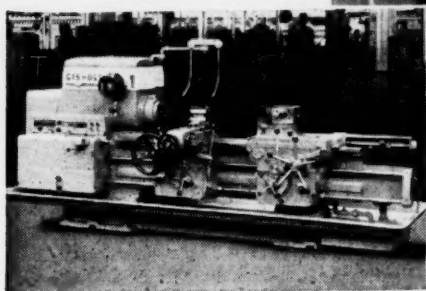
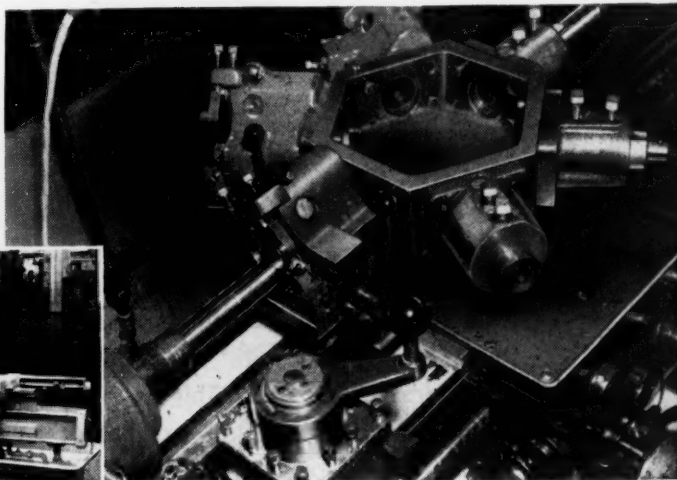
*Abrasive Quality is Reflected in the Finish of Your Product*



*take shaft jobs  
Like This:*

## they take less time on **GISHOLT TURRET LATHES**

*Yes, even in lots as small as  
5 or 10 parts, you can't beat  
turret lathes on this kind  
of work. Parts are machined  
complete in 2 operations—  
total time is less than 4 min.*



### **no extra equipment needed!**



THE GISHOLT ROUND TABLE  
represents the collective ex-  
perience of specialists in the  
machining, surface finishing  
and balancing of round and  
partly round  
parts. Your  
problems are  
welcomed here.



**TURRET LATHES . AUTOMATIC LATHES  
SUPERFINISHERS . BALANCERS  
SPECIAL MACHINES**

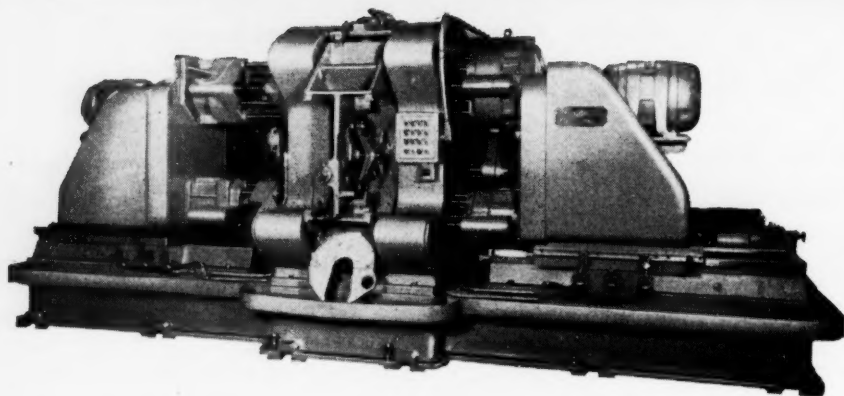
With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations . . . such as cutting to length or centering . . . are necessary. And with *two or more* tools from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.

## **GISHOLT MACHINE COMPANY**

MADISON 10, WISCONSIN

# SPECIAL DOUBLE-END DRILLING, BORING and TAPPING MACHINE



Illustrated is one of the special machines we are constantly building, in addition to our line of MULTIPLE DRILL HEADS, to meet the specific requirements of plants, large and small. This machine is used for drilling, boring and tapping the adapter plate on an automatic transmission . . . The part is completely bored, drilled and tapped on this machine. We are using two of our Standard HH-20 Horizontal Way Type Units with an Automatic Index . . . The complete cycle is 30 seconds. The part is clamped with hydraulic cylinders.

*We solicit your inquiry as to any special drilling,  
milling or boring operations you may have.*



## ICHIGAN DRILL HEAD CO.

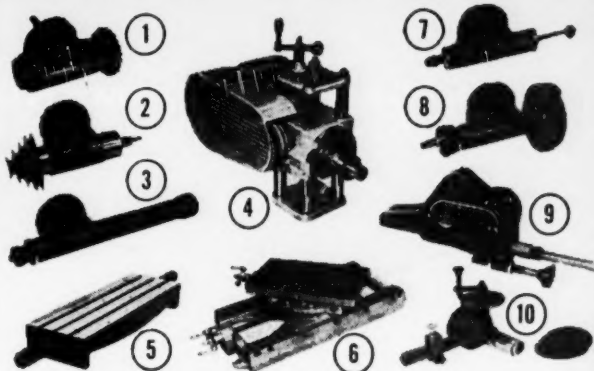
971 E. EIGHT-MILE ROAD

HAZEL PARK, MICH.



# master MACHINE TOOL ATTACHMENTS

for  
**LATHES  
TURRETS  
MILLS**  
OR USE INDEPENDENTLY



- |                                       |                                 |
|---------------------------------------|---------------------------------|
| 1. 90° Universal Milling Head         | 6. Universal Feed Table         |
| 2. Hi-Speed Milling and Drilling Head | 7. Internal Grinder Head        |
| 3. Deep-Hole Internal Grinder Head    | 8. External Grinder Head        |
| 4. Basic Milling Unit                 | 9. Slotting and Keyseating Head |
| 5. Milling and Grinding Table         | 10. Geared Dividing Head        |



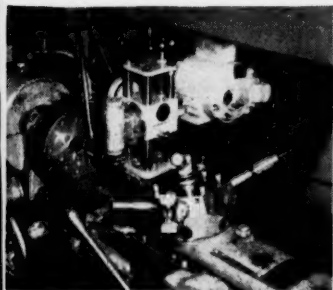
## THREE SIZES

MODEL "C," 1/2 hp — 9" to 13" LATHES  
MODEL "B," 1/2 or 3/4 hp — 13" to 18" LATHES  
MODEL "M," 1 to 3 hp — 18" to 72" LATHES

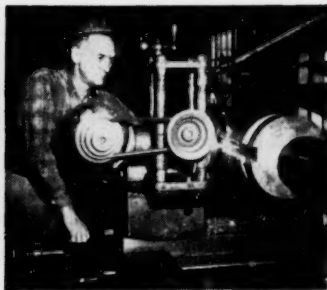
The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an outstanding value for maintenance, repair, tool room, and

experimental shops, as well as production, thus performs a full range of shop operations at a minimum investment. These improved models are outstanding in rigidity, capacity, and simplicity of set-up and operation and incorporate the latest features developed in our 17 years of manufacturing this tool. Investigate this valuable shop tool. For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries.

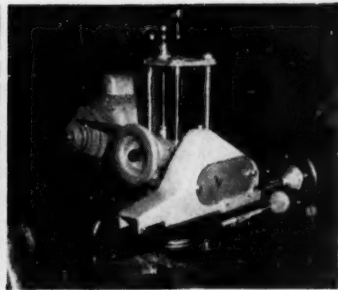
**MAKES LOW-COST INDEPENDENT PRODUCTION SET-UPS — PORTABLE — SELF-POWERED**



Milling on turret lathe completing part in one set-up



End Milling 2 1/2" keyway in 9 7/8" diameter shaft 22 ft. long



Master Slotting Head on lathe cutting internal taper keyway

**FREE**

WRITE FOR NEW ILLUSTRATED 24-PAGE CATALOG

**MASTER MANUFACTURING CO.**

1310 EAST AVENUE A • HUTCHINSON, KANSAS, U.S.A.





**BALANCED PERFORMANCE**

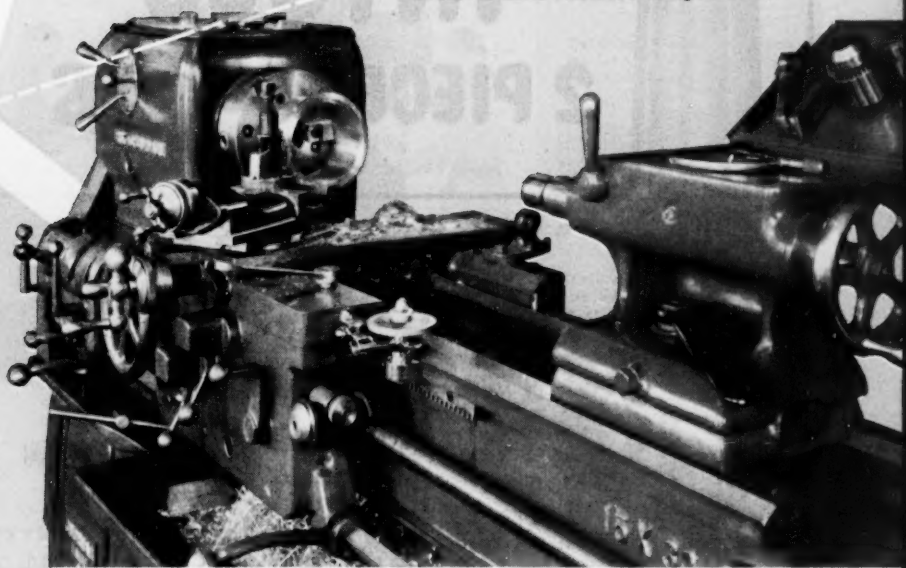
Hayes Scientific Appliances, Urbana, Illinois, often checks work done on their Cincinnati Tray-Top Toolroom Lathe with Zeiss Micrometers, and gets results consistent with inspections with gage blocks on a comparator! This, we think, is dramatic proof that you can do fancy work on Cincinnati Tray-Tops at un-fancy prices. Ask your dealer to show how and why balanced design Cincinnati Tray-Tops deliver important bonuses in precision as well as production.

*best buys in their class!*

**CINTILATHE**

## PRECISION PLUS | AND LOW COST

The part: bronze cap for vapor condenser, made by Hayes Scientific Appliances. Tolerances: fit to cylinder within .0003. Faces must be flat and square to seal with bellows ring. Time saved: 30 min. This 15 x 30 Cincinnati Tray-Top Toolroom Lathe has helped Hayes handle some of their trickiest assignments.



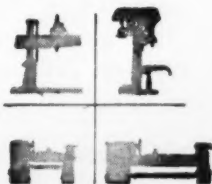
**CINTILATHES:** The complete, balanced line: Tray-Top for light duty (engine, toolroom and gap bed models); 10", 12½", 15", 18" sizes; 18" to 114" center distances. Model LT for medium duty (engine and gap bed models); 16", 18", 20", 24" sizes; 30" to 264" center distances. Write for catalogs and name of your nearest dealer.



*best buys in their class!*

# CINTILATHE

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U. S. A.



# CUT DEAD CENTER COSTS WITH **INTOCO** 2 PIECE CENTERS



INTOCO centers are of two-piece design, consisting of a shank and replaceable tip. Just 5 different sizes of tips when used with the proper size INTOCO shanks fit all sizes of Morse, Brown and Sharpe, and Jarno tapers.

Available in four different alloys to fit the many different applications . . . Cobalt Base Alloy, Nickel Base Alloy, High Speed Steel Alloy, Carbide.

INTOCO Tips are ground all over to give perfect concentricity and seating. To replace, you need only knock out the old and install the new. Write today for free 8 page catalog which gives complete specifications on this line of 2 piece centers.

#### ITC Center Point Lubricant

ITC is the finest center point lubricant on the market. Recommended when using High Speed Steel cast alloy as well as Carbide lathe and grinding centers.



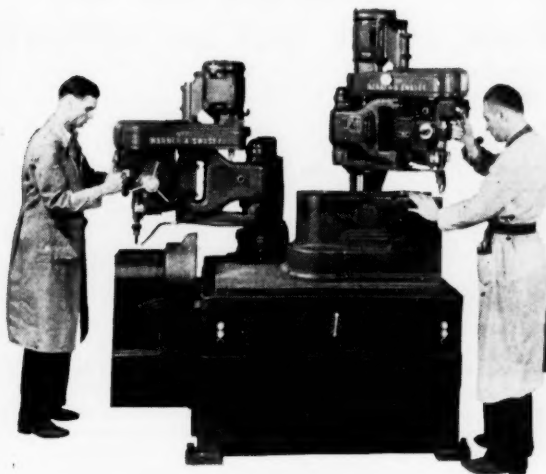
## **INTOCO SALES CO.**

distributors for **INTERSTATE TOOL COMPANY**

*Engineers, Designers and Builders of Special Machinery, Plant Equipment and Tools*

**427 W. 58th ST. • CHICAGO 21, ILLINOIS**

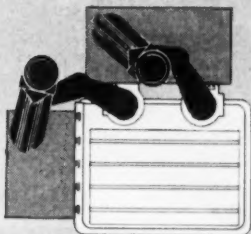
# NOW-PRECISION TAPPING FOR LARGE, BULKY PARTS!



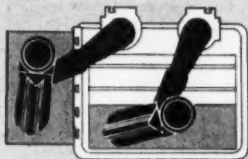
*Warner & Swasey No. 11R Radial Tapping and Threading Machine. Available with single or dual, independently-operated, tapping heads.*

**E**XTREME VERSATILITY plus the positive threading accuracy of Warner & Swasey's exclusive lead-screw principle are combined in the No. 11R Precision Tapping and Threading Machine. Here's one machine that handles Class 3 and 4 tapping on a production scale—in a wide range of materials—on bulky parts as well as smaller ones. Tapping heads swing to the work—push button control raises and lowers columns. It's simple to set up and operate—a machine you can count on to reduce scrap loss, cut costs.

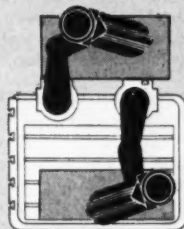
THREE CONVENIENT WORK SURFACES, AND TWO COMPLETELY INDEPENDENT TAPPING HEADS, MAKE MANY COMBINATIONS POSSIBLE ON THE NO. 11R DUAL RADIAL.



Extra long work pieces can be let into pits at rear and left end of machine.



One piece can be mounted on left end, another on top of base—or both on top.



Rear vertical work surface and top of base can be used at same time.

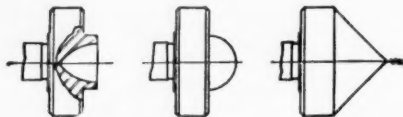
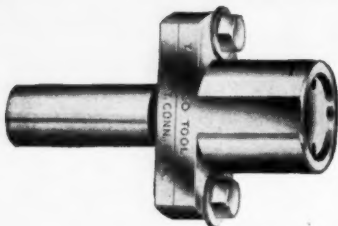


YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

*A new tool to help you  
save time and produce better work*

# ALCO

## COMBINATION ROLLER STOP and SUPPORT



EXAMPLES OF SPECIAL INSERTS  
FOR REVOLVING SUPPORTS

A NEW TOOL FOR YOUR SCREW MACHINES WHICH SERVES A DUAL PURPOSE

**REVOLVING STOP** — Used as a stop, the new Alco Revolving Stop prevents abuse of the work ordinarily caused by roughness, imperfections or chips which accumulate on a stationary stop. The disc in the Alco Stop revolves concentrically with the work with the concentric action quickly adjustable by the floating alignment feature of the tool. Oil will not splash when the work contacts the stop because the revolving disc is below the outside casing.

**REVOLVING SUPPORT** — As a support for long work or very accurate forming requiring rigidity, an easy-to-install insert takes the place of the revolving disc to fit the contour of the work being produced. The insert revolves exactly concentric with the work and supports it rigidly at the free end. The use of the Alco Revolving Support will make possible the forming on the sides of many jobs formerly considered impractical on the screw machine.

Eliminates chatter marks caused by vibration . . . No friction between the stop and the work . . . Increased feeds on forming . . . Rigid support on long pieces.

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latest catalog

ALCO MAKES

DRILL CHUCKS, TAP HOLDERS,  
ACORN AND BUTTON DIE  
HOLDERS, RELEASING MODEL  
TAP AND DIE HOLDERS, HOL-  
LOW MILL HOLDERS, REVOLV-  
ING STOP AND SUPPORT.

# ALCO EFFICIENT TOOLS

THE ALCO TOOL COMPANY

52 Birdseye St., Bridgeport, Conn.

## hendey lathes are better built...

**FOR LONGER, MORE ACCURATE LIFE!**

*And here's how it's done* — Hendey starts with quality design and follows through with quality workmanship. Take the hardened and precision ground bed ways, for instance. Hendey does this differently *and better!* First, the world's most modern induction hardening equipment uniformly hardens the ways. Next, the precision machined legs and chip pan are attached to the bed (and they are never removed thereafter). Ultra precision grinding follows. Exacting checks for accuracy are then followed by electronic testing for hardness — uniform hardness — there are no soft spots in a Hendey bed — and a customer's test sheet proves it!

Add to this, quiet headstocks, the finest of lead screws, simplified, convenient controls and the ruggedness and power essential for modern precision turning.

Hendey lathes maintain the Hendey tradition for quality and accuracy. And there is the *right* machine in the Hendey line to suit your precision turning requirements. Write for details.

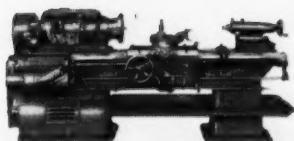


*Featuring uniformly hardened and precision ground bed ways.*

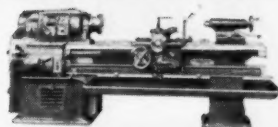


**the Hendey  
machine co., inc.**  
torrington, conn., u.s.a.  
—precision machine tools—

*distributors in principal cities*



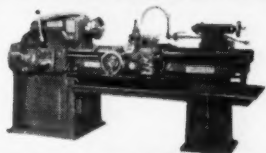
**18" — 20" — 24" 12-speed Geared Head Lathes**



**12" — 14" — 16" 18-speed Geared Head Lathes**



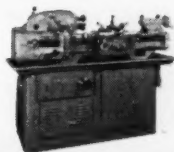
**12" — 14" — 16" 12-speed Geared Head Lathes**



**No. 2 General Purpose Lathe**



**No. 1 General Purpose Lathe**



**9" x 24" Tool & Gage-Makers' Lathe**

# AMES



## ...the preferred Dial Indicators

One of America's largest and most famous mass-producers recently chose Ames as preferred source of supply for indicator gauges. They did because the four sizes of Ames "Hundred Series" indicators fit every measuring requirement; they are *accurate, sensitive, low in friction, yet are rugged and tough* — give *more on-the-job time*. All Ames products embody latest design and highest-quality materials; they are manufactured by methods and machines that are *exclusive* with B. C. Ames Co.



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Dial Depth Gauge  
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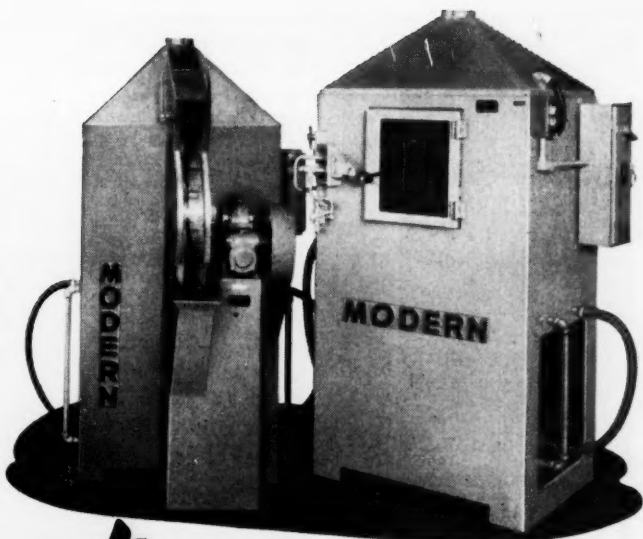
**B. C. AMES CO.**

29 Ames Street  
Waltham 54, Mass.

Mfrs. of Micrometer Dial Gauges • Micrometer Dial Indicators



Larger parts are deburred in Maizo Blast machine (right) with stationary fixture. Operation is automatic when door is closed. Small parts are deburred in model with continuously rotating ferris-wheel type fixture (left).



# *Blast* THOSE BURRS! with Modern Maizo Blast

If you're being plagued with light burrs on high-production metal parts, get Modern Maizo Blast equipment and forget them.

Simply load the parts into a continuously rotating fixture if they're small—larger parts are placed on a stationary fixture in a door-operated model. The rest is automatic. A blast of high-pressure air containing ground maize or walnut shells quickly whisks off burrs.

Proper blasting material enables you to deburr without pitting finished surfaces.

Outstanding performance and quality are notable features of Maizo Blast equipment. That's because it's made by the maker of the famous Burr-Masters, the fastest production gear burring and chamfering machines available. Modern has put the same "know-how" into the Maizo Blast design to give the utmost in operating efficiency.

Write today  
for Bulletin 103-57  
covering Maizo  
Blast equipment  
for both small and  
larger parts.

**MODERN**  
*Industrial Engineering Co.*

14230 BIRWOOD AVE.  
DETROIT 4, MICH.

**CUT AWAY  
METAL FROM  
INTERNAL  
CYLINDERS  
"MOSTEST  
AND  
FASTEST"  
WITH  
FULMER  
HONING  
MACHINES**

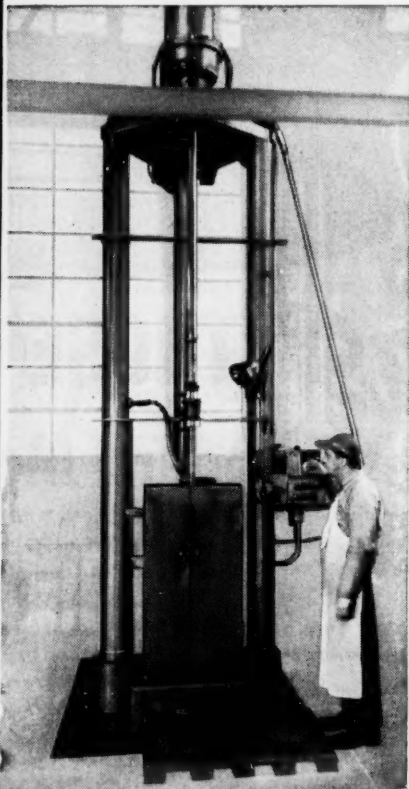
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our  
honin  
bulletin**

**ACCURACY**

self-aligning hones remove rough spots of the internal surface and then hone the bore to tolerances up to .0001" ( $\pm$ ) on ferrous, non-ferrous metals, plastics, glass, etc.

**SPEED**

exact, uniform, constant, removes up to 1/16" from diameter at 1 1/2 to 2 cu. in. per min. Fastest, most economical honing, always dependable.



**Why Shop  
Around?**

**FULMER  
supplies  
"everything  
in one  
package":  
Honing  
Machine,  
Hones,  
Stones,  
Fixtures,  
Tools.**

*Photo taken in  
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Co., Libertyville,  
Illinois, world's  
largest tractor-  
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# PENSCO DUAL WHEEL



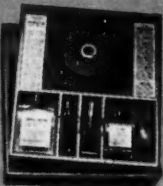
## NEW, PRACTICAL SHARPENING METHOD... FINISH GRIND AND DIAMOND LAP!

### CARRIDE...STELLITE...HIGH SPEED

Sharper cutting edges . . . Increased tool life . . . Economical . . . Accurate . . . Easy to use . . . Fast cutting . . . Adaptable to all tool grinders.

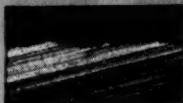
After rough grinding in the usual manner, tool faces are finish ground dry on the 120 grit silicon carbide vitrified bond grinding wheel section of the Pensco Dual Wheel. Then, in a matter of seconds, the tool is diamond lapped on the Pensco phenolic resin insert charged with Spectrum Diamond Lapping Compound (diamond paste) of the desired grit size. A U.S. Standard #30 (600 grit) is usually

preferred. This reduces the surface finish of the cutting edge from 15 to 20 mu R.M.S., after finish grind to 1 to 2 mu R.M.S. after diamond lapping. The results are superior to those obtained with diamond wheels.



Pensco Dual Wheel Kit

The Pensco Dual Wheel is supplied complete in a convenient kit with a 5 gram tube of Spectrum Diamond Lapping Compound, choice of any standard grit size. Also included is a 4 oz. bottle of diamond lapping oil with atomizer applicator, wheel lap charging roller and complete directions for use. The complete kit is priced at \$69.50. State grit size desired when ordering.



Microphotographs show finish grind on 120 grit diamond wheel (left) and diamond lap with 600 grit (right)

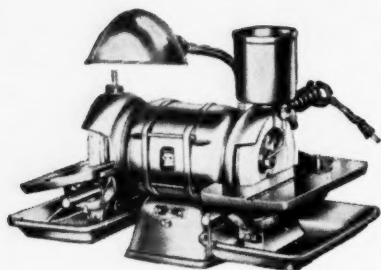
For complete information write:

**PENN SCIENTIFIC PRODUCTS CO.**

3941 ALMA STREET, PHILADELPHIA 24, PA.

# Baldor

BALL-BEARING GRINDERS



Clip this ad and mail for bulletins on  
Carbide Tool Grinder.

## NEW BALDOR W-I-D-E CLEARANCE GRINDER

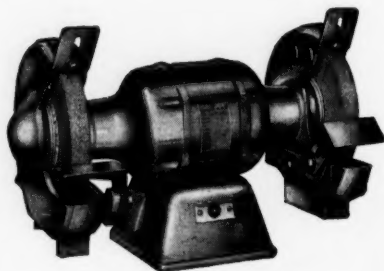
Baldor is a basic manufacturer of Grinders—even the motors are built by Baldor. The new streamlined grinder, 8200 series, is excellent for grinding long and odd-shaped pieces as there's plenty of clearance between the wheels and the motor frame.  $\frac{1}{2}$  hp, 3450 RPM, capacitor-start, capacitor-run motor GUARANTEED 2 years against burnout. Baldor makes a complete line of 6"-12" general purpose bench and pedestal grinders. Complete price as shown.

**\$86.00**

## CARBIDE TOOL GRINDER FOR PRECISION WORK

The  $\frac{1}{2}$  hp motor that powers this Baldor Carbide Tool Grinder has no commutator, no centrifugal switch, no brushes—a really trouble-free motor that will not burn out even when overloaded repeatedly. Electronically balanced within 1/50 ounce of perfection, the armature rotates at 3400 RPM without vibration—an engineering achievement that makes true precision work possible. Complete price, as shown.

**\$143.20**



Note exhaust type guards.  
Ask for Bulletin 353.

## BALDOR ELECTRIC COMPANY

5353 Duncan Avenue

• St. Louis 10, Missouri

**Here's a money saving  
answer to many  
design problems**

## *S.S. White* **FLEXIBLE SHAFTS**

Problems involving the transmission of rotary power and mechanical remote control come up all the time in machine design. And to many of these problems, the *simple, low-cost* and, often, the *only* practical answer is an S.S. White flexible shaft—a single, self-contained mechanical element that offers unequalled adaptability and flexibility in meeting all types of space, operating, servicing and production requirements.

A few of the many ways in which S.S. White flexible shafts can be used are illustrated here. Our engineers will be glad to cooperate with you in working out details of your own application.



### **HERE'S VITAL INFORMATION FOR ECONOMY-MINDED DESIGNERS**

*256 pages of information and data  
on how to select and apply flexible  
shafts—sent free if you request it  
on your business letterhead.*



Used as flexible drives



To make control knobs  
accessible



Used as an adjustable drive  
coupling

**THE *S.S. White* INDUSTRIAL DIVISION**  
**DENTAL MFG. CO.**



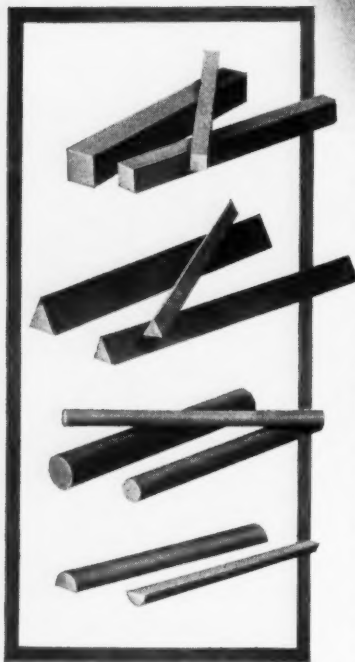
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NEW YORK 16, N. Y.

WESTERN DISTRICT OFFICE

• TIMES BUILDING

• LONG BEACH, CALIFORNIA

**THAT EXTRA  
TOUCH BUILDS...**  
*higher quality  
in your work*



### **INDIA® and HARD ARKANSAS\* OILSTONE FILES**

For real precision work-fitting dies and machine parts, deburring, radiusing, chamfering and touching up cutting-tool edges — there is nothing to equal hand stoning. **INDIA** and **HARD ARKANSAS** files, shaped to conform to the work surfaces, enable you to do a quick stoning job to meet close tolerances. **INDIA** files, of tough, hard electric-furnace abrasive, are favored for general "quick touch-up" work, while **HARD ARKANSAS**, a fine textured natural stone, gives you the ultimate in "superfine" edges and finishes.

For Export: Norton Behr-Manning Overseas Inc.,  
New Rochelle, N. Y., U. S. A.

In Canada: Behr-Manning (Canada) Ltd., Brantford.

Catalog 19 gives complete data on the more than 200 sizes, shapes and grits available. Write Behr-Manning, Troy, N. Y., Dept. MS-8.

® \*Trade-Marks



## **BEHR-MANNING**

CORPORATION  
division of **NORTON Company**

▲ COATED ABRASIVES ▲ SHARPENING STONES ▲ PRESSURE SENSITIVE TAPES

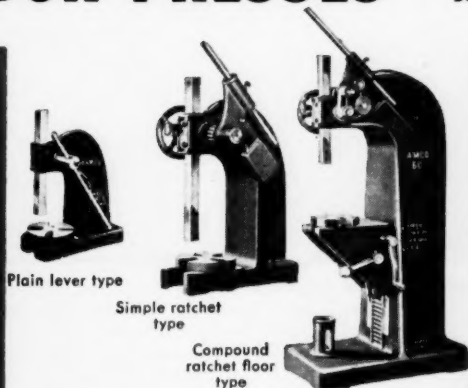




# Famco

## ARBOR PRESSES

IN 32  
MODELS



Plain lever type

Simple ratchet  
type

Compound  
ratchet floor  
type

Famco offers the world's most complete line of arbor presses, assuring the most economical size for every job. 32 rugged bench and floor models deliver from  $\frac{1}{2}$  to 15 tons pressure. Plain lever, simple ratchet, combination compound and simple ratchet types have exclusive front and side gib adjustment for perfect ram alignment. Reinforced semi-steel frames, alloy steel rack and pinion. See your Famco Dealer or write for Catalog.

## FAMCO MACHINE COMPANY

3122 SHERIDAN ROAD • KENOSHA, WISCONSIN

AIR PRESSES • ARBOR PRESSES • BAND SAWS • DRILL PRESSES  
FOOT PRESSES • POWER PRESSES • SQUARING SHEARS





#### **Bunting Standard Stock Bearings**



Completely machined and finished—ready for assembly—Bunting Standard Stock Bearings can be immediately installed in most machine tools and industrial machinery. Unusual requirements are quickly and economically met by slight additional finishing. Your local Bunting distributor stands ready to serve you at all times.

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Your Bunting Distributor is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. He carries in stock, for your money saving convenience, completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes meeting all your usual production and maintenance needs. Ask him for catalog.

# Bunting®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS



THE BUNTING BRASS & BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

it can't  
happen here!

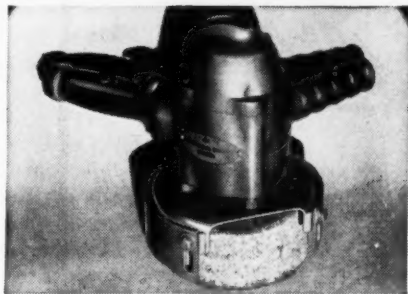


Dismantling an air tool for regular inspection and maintenance is one way to insure better air tool performance.

Unfortunately, it's also one way to wear out or strip threads in tool housings—and that means re-tapping the holes and using oversize screws, which adds to tool maintenance time and costs.

Fortunately, this can't happen to you—if you're using Buckeye tools—because every threaded hole in Buckeye tool housings has a *replaceable* Heli-Coil insert. That means you always drive screws into a hardened steel thread—so you can't wear or strip threads in the housing—ever.

This, and many other exclusive Buckeye Tools features are completely described in our Air Tools and Electric Tools catalogs. Write for one, or both, today.



# Buckeye Tools

CORPORATION

DIVISION 17 • DAYTON 1, OHIO

Portable Air  
and Electric Tools  
for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

# NOW---



## DASCO

**SUPER SOLUBLE BASE**

ONE phase of Stuart's continuous research program on metal-working oils and compounds has been directed toward the formulation of a better water-mix cutting and grinding fluid. A heavy duty type water-mixture that would improve machine efficiency on both classes of work, and which could be used at leaner mixtures than normally recommended for soluble oils.

**D.A. Stuart Oil co.**  
EST. 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2741-47 S. Troy St., Chicago 23, Ill.

In Canada: R. W. Horsey Canada, Ltd.

Subs. D. A. Stuart Oil Co., Ltd.

3575 Danforth Ave., Toronto

# **an improved water-mix base oil especially formulated for both cutting and grinding application**

**FOR WATER-MIX CUTTING APPLICATIONS.** A heavy duty water-mix cutting fluid base, capable of filling the gap between conventional soluble oils and straight cutting oils, must contain more than ordinary petroleum oil if superior performance is to be realized. The manufacture of Dasco Super Soluble Base incorporates a heavy duty base oil — widely known for its performance record on the toughest metalworking jobs.

The advantages gained from this unique feature include superior performance at leaner mixtures than other heavy duty water-mixes. Mixtures normally start at 40 to 1 for turning, drilling, milling, sawing, boring, reaming. Only on some surface broaching, and round hole broaching operations has it been necessary to use mixtures as rich as 15 to 1.

**FOR WATER-MIX GRINDING APPLICATIONS.** Cylindrical, surface, and centerless grinding operations call for a water-mixture with a higher detergency factor than that found in ordinary soluble oils. Better rust inhibiting and stability characteristics are required because of the leaner mixtures usually used for grinding. Dasco Super Soluble Base has been used for exceptionally long periods of time, at leaner mixtures than 100 to 1, the recommended starting mixture, with no problems due to rusting, separation or rancidity.

**TWO WATER-MIXES BUILT INTO ONE.** The combination of extra cutting value, high grinding value, excellent stability and great resistance to rancidity makes Dasco Super Soluble Base an ideal water-mix for both cutting and grinding — one that has been especially formulated to give top performance on both classes of work — at leaner mixtures than ordinarily recommended for other heavy duty products — and priced lower than normal for a product of such high quality. Send coupon for complete data.

## **SEND COUPON FOR COMPLETE DATA**

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CHICAGO 23, ILL.**

Check One ☐ Have Stuart Representative Call  
☐ Send Data On Dasco

Your name .....

Title .....

**More Than  
a "Coolant"  
is Needed**

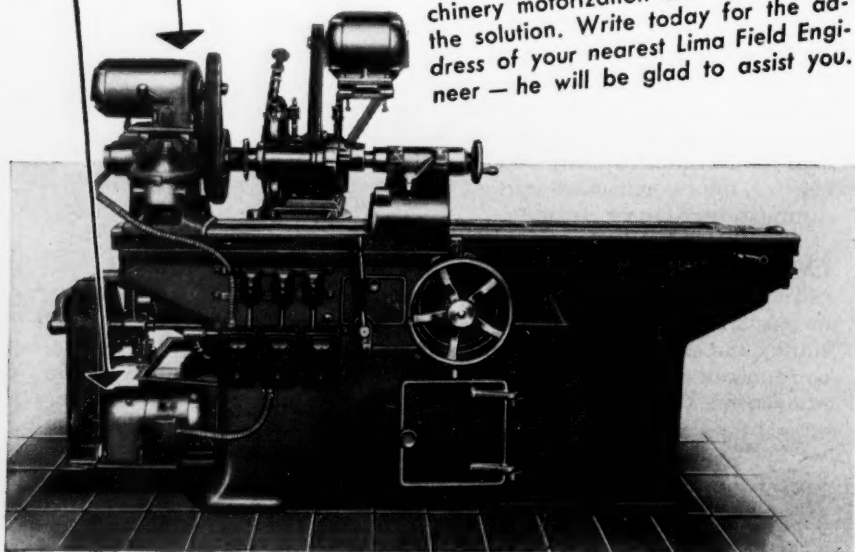
# LIMA

## FOR INDIVIDUAL MOTORIZATION

The Landis Universal Grinder illustrated has been individually motorized with two LIMA GEARSHIFT DRIVES and one LIMA MOTOR to meet requirements of the machine for both constant and selective speeds.

This is but one of many motorization problems easily solved by the combined use of Lima Drives and Lima Motors. Lima units are used extensively on standard and special machine applications, as well as by original equipment manufacturers.

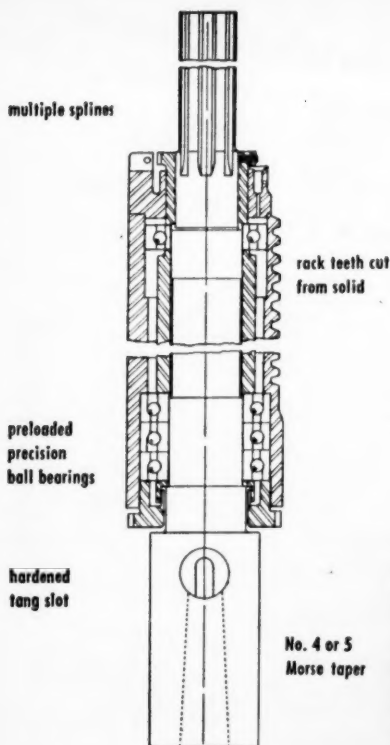
If you have a Drive or Motor problem, why not consult LIMA — their Field Engineers have wide experience in machinery motorization and can provide the solution. Write today for the address of your nearest Lima Field Engineer — he will be glad to assist you.



**THE LIMA ELECTRIC MOTOR COMPANY**  
**168 Findlay Road, Lima, Ohio**



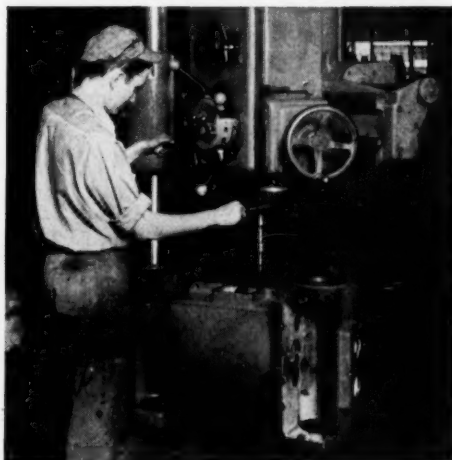
**FIRST... FOR DRIVES... MOTORS... GRINDERS**



# ACCURATE

Job after job, Cincinnati Gilbert spindles stay right on "O". The  $4\frac{1}{4}$ " OD alloy steel quill has a 12" long bearing in the head; spindle is mounted in the quill with three ABEC No. 5 precision, preloaded angular contact ball bearings at the bottom and one at the top. The Gilbert spindle gives maximum accuracy even under strains of improperly sharpened drills, uneven depths of cut, as well as normal thrust load of feeding . . . For sustained accuracy, make your next radial a Cincinnati Gilbert. Write for Bulletin 349.

# FLEXIBLE



In the photo at the right the operator drills and taps a total of 35 holes, on five faces of the casting, by using a Cincinnati Gilbert Universal Table.

RADIALS  
HORIZONTAL BORING MILLS  
ACCESSORIES

## THE CINCINNATI GILBERT

MACHINE TOOL COMPANY

3366 BEEKMAN ST. • CINCINNATI 23, OHIO

THOSE WHO BUY GILBERT BUY GILBERT AGAIN



# L-W

## SWIVEL BASE MILLING MACHINE VISES

**THESE VISES CAN TAKE IT!**  
They're Built for Brute Strength  
and Accuracy . . . yet  
**ARE REALLY LOW PRICED!**

**Ideal for drill press and shaper work.**

High-grade semi-steel castings. Hardened steel sliding jaws with full length bearing on a ground bar and machined ways. The 4 1/2" and 6 1/2" sizes have a large Acme steel screw with replaceable bronze nut. Four bolt and key slots for rigidly attaching to table so the work-holding surfaces are at true right angles or parallel to the table.

### HUSKY \$24.00

Jaws 3" wide, 1" deep. Opens 2" with jaws. Wt. 16 lbs.

### JUNIOR \$40.22

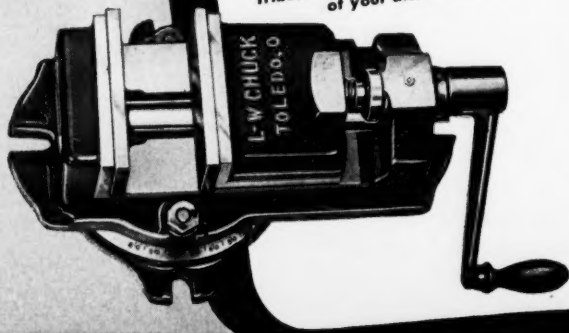
Jaws 4 1/2" wide, 1 3/4" deep. Opens 3" with jaws, 3 1/2" without. Wt. 40 lbs.

### MASTER \$60.03

Jaws 6 1/2" wide, 2" deep. Opens 4" with jaws, 5 1/4" without. Wt. boxed 85 lbs.

### Immediate Delivery

Order from your industrial supply distributor or order direct, giving name of your distributor.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

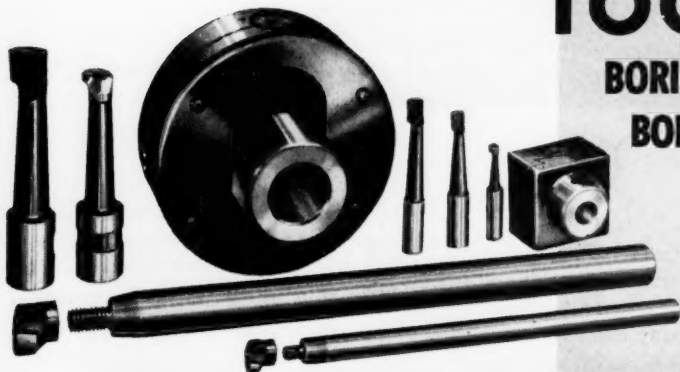


**L-W CHUCK COMPANY** 28 SO. ST. CLAIR ST.  
TOLEDO 4, OHIO

for more *Accurate* cuts...  
greater *Rigidity* in

## BORING TOOLS

BORING HEADS  
BORING BARS



## Use **CRITERION** BORING EQUIPMENT

### BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

### THIS COMBINATION WILL PRODUCE RESULTS.

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ¾ to 1¾ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

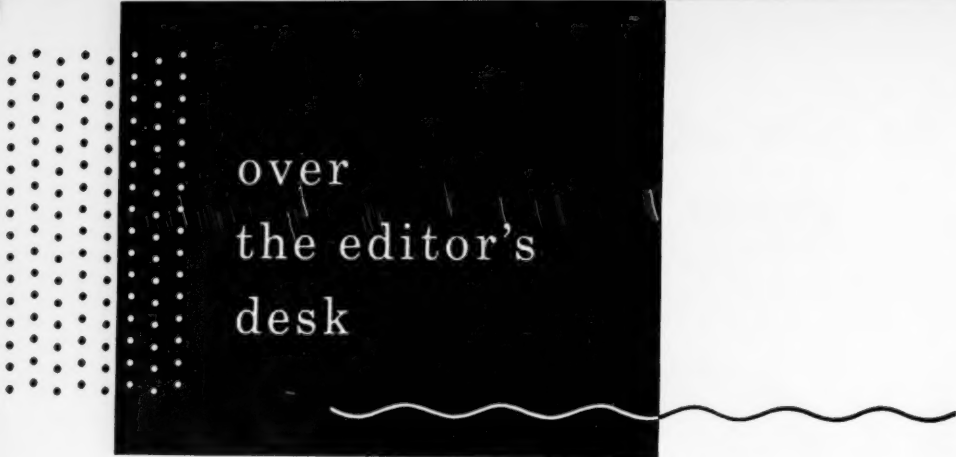
### LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

See the complete line of **CRITERION TOOL PRODUCTS** at your local dealers or write for free catalog.

**CRITERION  
MACHINE WORKS**

9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.



## over the editor's desk

### Thank You

We would take these few lines of space in this column to acknowledge the flood of congratulatory messages we have received from our many friends throughout the industry on the occasion marking our twenty-fifth year of publication. It has been most gratifying to read these messages and to realize how helpful—and necessary—Modern Machine Shop has become to those who read it each month and apply the information to their daily jobs.

If all the good wishes on this anniversary come true, we will be around for a long time, helping you to do your job a little better.

### September Issue

For the past few months the editorial staff has been busily engaged in "Project September Issue"—an endeavor to gather together as much information as possible on the theme, "More Production Through Modernization." Outstanding men in the field are lending their efforts to this venture which we are sure you will find stimulating and thought-provoking. Many spe-

cific examples of modern equipment in action will highlight the issue. Be sure to watch for the September issue. It will be coming your way in a few short weeks.

### Importance of Viewpoint

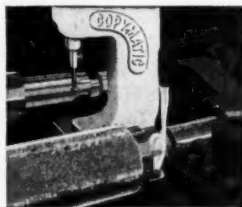
What a savings account will do to a man was once forcibly expressed by a socialist soapbox orator in these words:

"I can get along with anybody in my audiences except these mean, stingy, little fellows who have saved up a few hundred dollars in the savings bank and then have borrowed enough more to build a little house for two families, living downstairs themselves, and renting the upper half. When I begin to talk about dividing up they go out by the whole seatful at a time."

William Graham Sumner, the economist, often referred to this statement, which he regarded as the most eloquent recognition he had ever heard of the power and beneficence of capital.

There is no experience equal to that of putting yourself in the other fellow's place if you want to get the other fellow's viewpoint.

**HOW HIGH  
IS UP?**



Perhaps it's "the point toward which manufacturing costs are constantly climbing." What methods may be used to keep costs and prices from vanishing out of sight and reason?

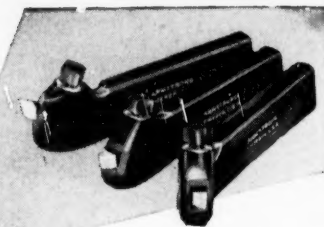
Since time and manpower are the vital elements in costs, many progressive manufacturers are using Lodge & Shipley COPYMATIC Tracer Controlled Lathes to combat rising costs. Carefully verified reports show time savings as high as 87%, production increases up to 536%, savings of \$14,000 in a year.

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# MODERN Machine Shop

**Vol. 26, No. 3**  
**AUGUST, 1953**

features  
in this issue

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**Producing High Speed Turbine Wheels**

*By Gilbert C. Close*

This article describes the extruding and profiling methods involved in the manufacture of tiny turbine wheels for aircraft at AiResearch Manufacturing Company. Page 114.

**Metal-Working Belt Drives**

*By John E. Hyler*

A comprehensive discussion covering the features and advantages of both flat-belt and V-belt drives. Many helpful hints regarding maintenance of belts are included. Page 120.

**An Effective Safety-Training Program**

*By Alfred M. Cooper*

This article will be especially helpful to those responsible for instituting and maintaining safety programs. Page 136.

**Collective Bargaining in the Machine Shop**

*By Robley D. Stevens*

In this article particular emphasis is placed upon the responsibilities of a foreman who plays a key role in today's management setup. Page 150.

**Moving and Setting Machinery**

*By Ira S. Roberts*

The author describes several effective methods which can be easily employed for transporting and installing heavy-type equipment. Page 172.

**Case History No. 7—Machining Stainless Steel**

*By G. J. Stevens*

This case history involves the machining of a valve which is being produced by a manufacturer of bottle-filling equipment. Page 176.

**Coming Next Issue . . .**

The entire editorial feature section will be devoted to the theme "More Production Through Modernization." Many time-saving ideas will be presented for the busy production executive. Be sure to watch for it.



# Producing High Speed Turbine Wheels . . . .

By GILBERT C. CLOSE

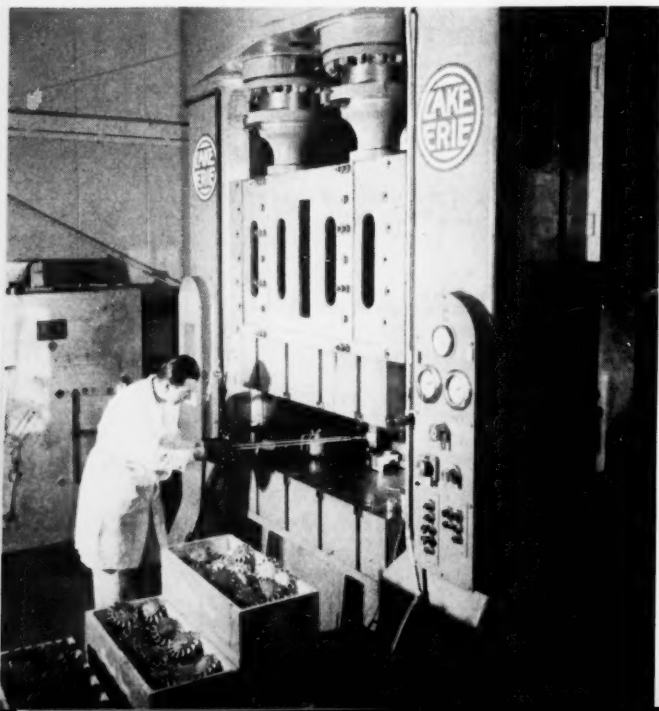
*Extruding and profiling methods for manufacturing tiny turbine wheels for aircraft to five millionths of an inch tolerance are outlined.*

FOR many years, fine watches were used as the criterion for the ultimate in precision machine work. Today, this honor could be logically transferred to many other products in which precision requirements exceed the finest tolerances ever used in watch production. Perhaps chief

among these products are the high speed turbine wheels used in small turbines intended for cooling and air conditioning military jet airplanes and high-flying, fast-moving civil aircraft.

At AiResearch Manufacturing Company, Los Angeles, one such turbine wheel, about two inches in diameter,

is designed to operate at 105,000 r.p.m. and, in the final phase of its production, is electronically balanced to apparent tolerances not exceeding 5 millionths of an inch. This is some 30 times more exacting than the narrowest tol-



Extruding high-speed turbine wheels on a 1100-ton Lake Erie press in the AiResearch Phoenix, Arizona, plant. Oven in background is used to heat the aluminum slug to 700-800 degrees F. just prior to extruding; press dies are maintained at approximately 500 degrees F. by means of electrical heating elements. The extruded turbine wheels require a minimum of finish machining.

Hand-finishing one of the "broken" turbine wheel extrusion dies. Critical die tolerances (plus-or-minus 0.0005 inch) must be maintained.



erances used in fine watch production. This little turbine, no larger than a man's fist, accepts air at 150 degrees F. and expels it at 15 degrees F., using the air expansion principle to obtain the cooling.

The volume of air expelled is sufficient to cool a 5-room house situated in the hottest part of Death Valley, California. Air velocity in the vicinity of the tiny turbine wheel rages at a supersonic 800 miles per hour.

In all, AiResearch produces 16 different turbine wheels that operate at 40,000 r.p.m. or faster. Some of these wheels are stress tested in whirl pits at speeds upward to 160,000 r.p.m. When one of these wheels explodes, you may be sure that reconstruction of the wood-lined whirl pit is in order.

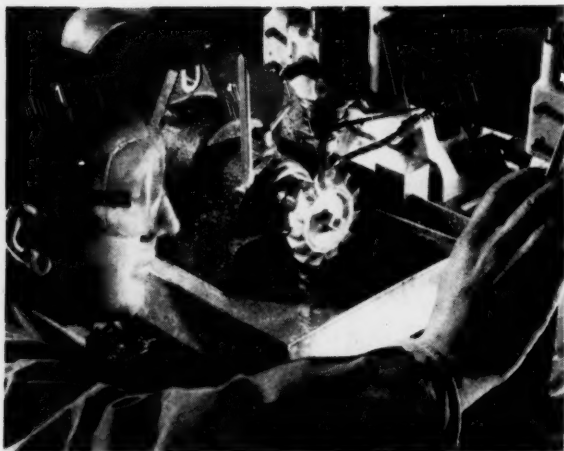
AiResearch engineers are generally agreed on one point—each different turbine wheel presents its own production problems. Some of these problems are hard to solve and demand inventiveness rather than extensive tooling experience. In one case, a shop employee was paid a \$3000 bonus for an idea to retool a conventional shop machine so that it would automatically profile one turbine wheel's blades.

While cast turbine wheels work very well in lower speed turbines, they are less satisfactory at speeds of 40,000

r.p.m. and upward. At AiResearch, most of the high speed wheels are either profiled from production blanks or extruded. Either process is critical and demands the utmost in both tooling and operator experience to obtain the necessary precision requirements.

In extruding turbine wheels, a 250-ton press is used at the Los Angeles plant and a 1100-ton draw press at the company's Phoenix, Arizona, plant. Broken dies are used, into which a hot slug of either 24S or 61S aluminum alloy is extruded, to produce the wheel.

Die construction is critical. In the 250-ton press used in the Los Angeles plant, the dies are bolt-mounted and allowance must be made for bolt elongation during extruding. This amounts to approximately 0.010 inch. The top of the upper die half is tapered very slightly downward toward the periphery so that a perfect edge seal is obtained between the die and the descending punch. This is very necessary as the slug top coincides with the die top and, minus a perfect seal be-



Profiling a high-speed turbine wheel on a Gorton profiling machine. Tolerances within 0.0001 inch are maintained.

tween punch and die, the initial tendency of the metal would be to extrude between these interfaces.

The slugs themselves are critically dimensioned, being held to a plus-or-minus 0.001 inch on the o.d. and plus-or-minus 0.005 inch in length. The slugs are heated to 700-800 degrees F. prior to extruding, and die temperature is maintained at about 500 degrees F. by electrical heating elements. These temperatures are well below the critical temperature of either 24S or 61S alloy.

Very little machine work is required on the blades of the extruded wheels, with deburring the only necessary op-

effectively removes the unfilled corner portions of the blades. The blades are then chucked in another lathe for facing and beveling. These operations are held to 0.0005-inch tolerance.

The second method of producing turbine wheels is by profiling. The two AiResearch plants (at Phoenix and Los Angeles) have a total of ten Gorton profiling machines between them,



Machine setup for cutting complicated contours on turbine wheel blades. Machine action in this operation is very similar to profiling.

After blades are profiled or extruded to correct dimension, they are faced on an ordinary engine lathe. Facing tolerances must not exceed 0.0005 inch.

capable of maintaining production tolerances of 0.0005 inch or better. In some cases, by using special patterns, three-dimensional profiling is accomplished. Each of these machines is equipped with a guide or profiling arm that permits a reduction from pattern to part ratio of 43 to 1. In most production work, however, a reduction ratio of from three to five is used. This means that any imperfection on the pattern will reproduce three to five times smaller in the profiled part.

Most of the profiling tools are company-designed using carbides. The carbide tools stand up well under this high-speed operation and retain a good cutting edge for a long time. About one hour is required to profile the average turbine wheel. Of course, when profiling from a production blank, subsequent machining or facing is not necessary as this is accomplished right in the profiling machine. A few of the turbine wheels which operate in the upper speed brackets are vapor blasted after profiling to blend all machine or cutter marks that might become points of stress concentration during



blade operation.

After profiling, the wheels are given departmental inspection for dimensional accuracy. The tolerances they must meet are 0.0002 inch on normality, 0.001 inch in concentricity, and 0.002 inch on all other dimensions. After this inspection, the wheels go to the finishing department where they are anodized in a chromic acid solution to give them better corrosion resistance and the hard oxide surface coating characteristic of the chromic-anodic process.

After anodizing, the wheels are electronically balanced. This is accomplished on a company-designed electronic balancing machine, incorporating an instrument-sensitive mandrel and shaft for spinning the wheels and an oscillograph which is operated from the shaft. The wheel is mounted in

this machine and brought up to its normal operating rotational speed. Meanwhile, the instrument-sensitive shaft imparts any stresses caused by wheel unbalance to the oscillograph, which, in turn, interprets these stresses in terms of "hills" or "valleys" on the light line drawn across the oscillograph screen.

The balancing machine is so correlated with the oscillograph that the position of these "hills" or "valleys" on the screen indicates which portion of the turbine wheel is heavy. The wheel is then stopped, and a small amount of metal is drilled from a blade root or on the faced section of the wheel on its heavy side. The wheel is then respun and checked, and the operation repeated until practically perfect balance is obtained. When completely balanced, the wheel operates as smoothly as though it had been profiled or extruded to a physically impossible 5 millionths of an inch toler-

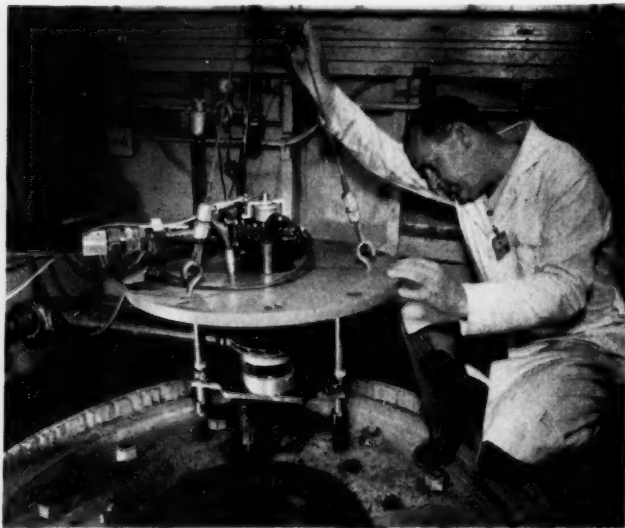
ance. The wheel is then ready for assembly into the turbine.

While other parts of the turbine are critical, they do not incur the tremendous stresses generated by high-speed rotation. Many of these parts are made by casting, some by machining, and a few by profiling. Tolerances in general are held very close, ranging from 0.0005 inch on stator units and inner case faces, upward to 0.001 inch to 0.005 inch on turbine structural parts.

Small expansion turbines for cooling purposes are a must for cooling the cockpits of supersonic airplanes where, minus a cooling unit and traveling faster than sound, skin-air friction would send cockpit temperatures soaring to unbearable limits. Failure of the turbine with the airplane traveling at such a speed would undoubtedly prove fatal to the pilot.

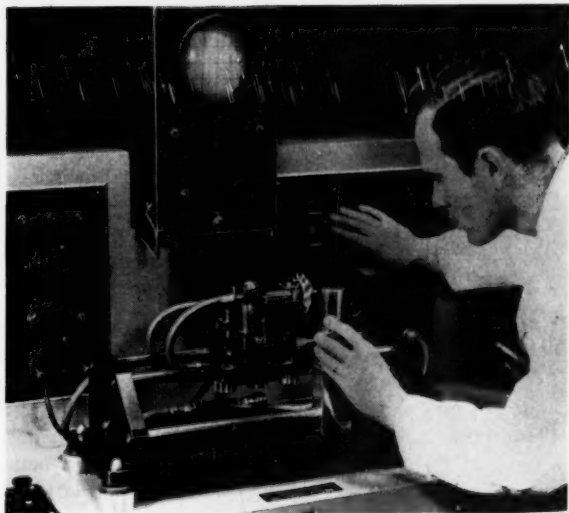
When the Douglas "Skyrocket" jet and rocket propelled experimental airplane soared better than 70,000 feet

into the air recently at Edwards Air Base in California, traveling at the unprecedented speed of better



▲  
Balancing a small turbine wheel on an electronic balancing machine. The oscillograph screen notes any unbalance and where on the wheel it is located. After balancing, the wheel has the equivalent of a physically impossible 5 millionths of an inch tolerance. The wheel shown in the balancing machine operates at 105,000 r.p.m. when in service.

Lowering a turbine wheel for a whirl test in the wood-lined whirl pit. Whirl speeds approaching 200,000 r.p.m. are employed on some wheels. The wooden pit lining prevents injury to fragments in case the wheel fails, thus facilitating metallurgical examination to determine cause of failure.



than 1400 miles per hour, it was an AiResearch air expansion turbine wheel, turning at better than 105,000 revolutions a minute, that made it possible for the pilot to live and land safely.

*Illustrations courtesy  
AiResearch Mfg. Co.*

**Manual on Cutting of Metals.** Second Edition. Published by The American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. 545 pages. Cloth binding. Price, \$10.00.

Written in collaboration with 22 specialists, this manual enlarges upon the first edition in that it incorporates a more descriptive presentation of tool materials and their treatment; of work materials and the relations of their behavior and properties to microscopic structure; and new material on the types, purposes, and application of cutting fluids.

Extensive new tables are provided, giving both unit horsepower and machinability ratings for a large number of steels of various hardnesses for specific tools and cuts; also charts for determining the speeds for further combinations of cut, tool shape, and material hardnesses. Specifications for many of the materials covered in the tables are for the most recent revisions

of mechanical properties. The tabular data on cutting speeds and horsepower of the first edition are retained because of their comprehensiveness.

**Aluminum in Iron and Steel.** By Samuel L. Case and Kent R. Van Horn. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 478 pages. Illustrated. Cloth binding, board covers. Price, \$8.50.

This book is the first of a new series of Alloys of Iron Monographs. The volume covers the major role assumed by aluminum in modern ferrous metallurgy. The first part of the book contains a summary of data showing the favorable effect of small amounts of aluminum when added to molten steel as a deoxidizer. The second part presents a correlation of data on the effect of aluminum as an alloying element in steel. The phenomena of inclusion formation, grain size, notch sensitivity, and aging are extensively treated.



# Metal-Working Belt Drives . . . . .

By JOHN E. HYLER

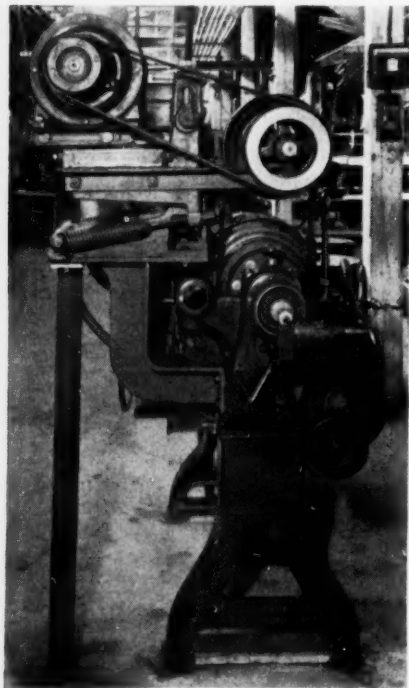
*The features and advantages of both flat-belt and V-belt drives are discussed in detail.*

**M**ANY types of belts are used in metal-working plants and machine shops for transmitting power. Some are flat belts and some V-belts. Flat transmission belting, although older than V-belts, has certain advantages. One advantage is its practical applicability to drives where a certain

amount of slippage is required under conditions of shock or overload. Another advantage is its suitability for shifting, generally (not always) in connection with an idler drive.

Flat belting is more carefully engineered today than previously; consequently, it is now suitable for use where once it could not be used to advantage. Flat leather belts may be obtained in an endless design if desired at a moderate increase in price; however, many sizable plants are prepared to make belts endless on the job as the need arises. Regular belt cements can usually be obtained from belt manufacturers for this purpose.

All flat belting transmits power by frictional contact between the belt and pulleys. Frictional values are therefore important in regard to pulley surfaces, as well as to belts. Flat belt pulleys should be slightly crowned or made somewhat larger in diameter at their center width. A belt tends to run on the largest diameter where pulleys are in line. Therefore, crowning pulleys a



Shown here is an interesting short-center leather-belt drive used on a lathe in connection with a Rockwood pivoted motor base. Illustration courtesy American Leather Belting Association.

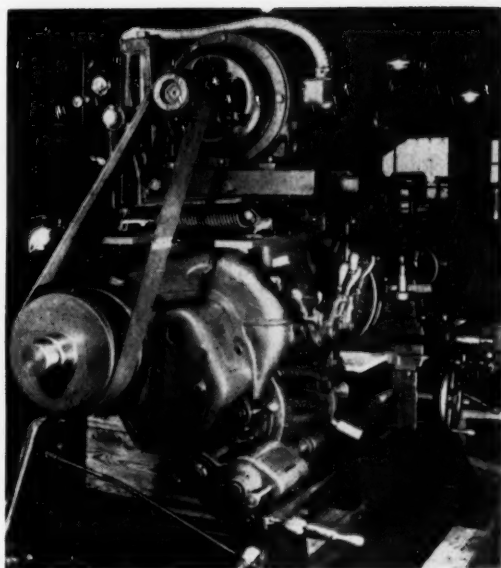
Interesting short-center belt drive applied to a lathe. The motor is mounted above the lathe on a spring-loaded and pivoted base. Illustration courtesy American Leather Belting Association.

bit at their center width aids in holding the belt to the proper travel.

#### **Average Belt Drive Now Shorter**

In the old days, many very long flat belt drives were used. Long lineshafts and long belt drives are now seldom found, except in special group drive arrangements. Due to the development of highly-efficient short-center flat-belt drives of automatic-tension type which either utilize the weight of the motor to keep belt tension constant, through the use of a pivoted motor base, or employ some kind of wrapper-pulley arrangement, flat belt drives can be highly efficient even when very short. The wrapper-pulley drive provides a high degree of efficiency by greatly increasing the arc of belt contact on both driven and driving pulleys.

Smaller-diameter pulleys should be fitted with thinner belts as far as consistently possible. A heavy-thickness belt will not flex efficiently around a small-diameter pulley. Also, smaller-diameter pulleys require the use of smaller belt hooks or fasteners, where fasteners are employed. Belt fasteners of the type incorporating hooks joined together with rawhide pins are employed to a considerable extent. Such fasteners should always be of a size recommended by the belt lacing manufacturer for the particular thick-



ness of belt being employed.

If hooks larger than necessary are employed for thin belts running over small-diameter pulleys, they necessarily incorporate longer hook legs, reaching farther back on the belt. Thus, there is less flexibility in the immediate location of the joint. The joint consequently will not be able to hug the pulley face as it would do if the correct size of hooks were used. Highly-efficient belt lacing machines for use with this type of belt fastener are generally employed.

#### **Data on Drives for Different Machines**

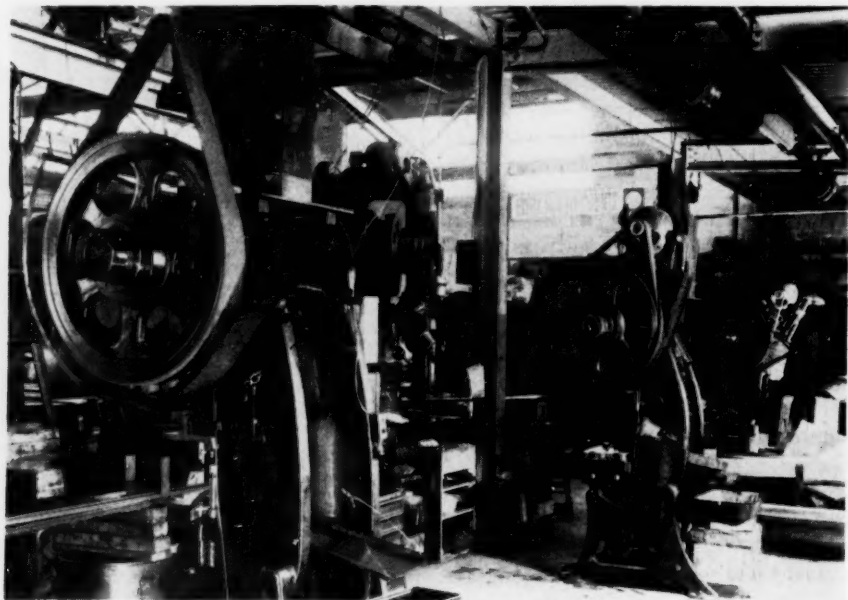
Some manufacturers of flat belts with wide experience in the metal-working field have compiled recommendations touching the type of belt best suited for use with practically all conventional machines most regularly employed. Data compiled have been listed for ready reference in some of

their literature, together with extensive information on methods for obtaining suitable belt lengths, belt speeds in feet per minute as derived from driving pulleys of given diameters at different r.p.m., and recommended motor-pulley diameters for motors of different types and sizes.

Exceedingly fast belt drives are definitely the exception in metalworking rather than the rule. Yet, a considerable number of them are found on high speed grinding applications, and so on. Usually, the employment of a very fast belt drive will lead to air being trapped between the surface of the belt and that of the pulley, greatly reducing the efficiency of the drive. Usually, on a high speed flat belt drive, a very

small pulley is involved at the driven end.

Smaller pulleys usually cause more difficulty than larger pulleys due to a combination of several factors. First, the actual arc of belt contact is always less on a smaller pulley, both in respect to degrees and circumference. If any considerable amount of weight is present in a belt, centrifugal force enters strongly into the picture. Running at high speed, a flat belt suddenly rounding a small-diameter pulley tends to be thrown outward and thereby lose contact with the face of the pulley, especially at the on-running side. This condition still further lessens the true arc of contact and further reduces efficiency.



This illustration shows a number of short-center belt drives to press flywheels, the driving motor being mounted atop the press in each case. Although the arc of contact on the motor pulley is small in a drive of this type, the drive serves to largely sustain its own momentum. Illustration courtesy American Leather Belting Association.



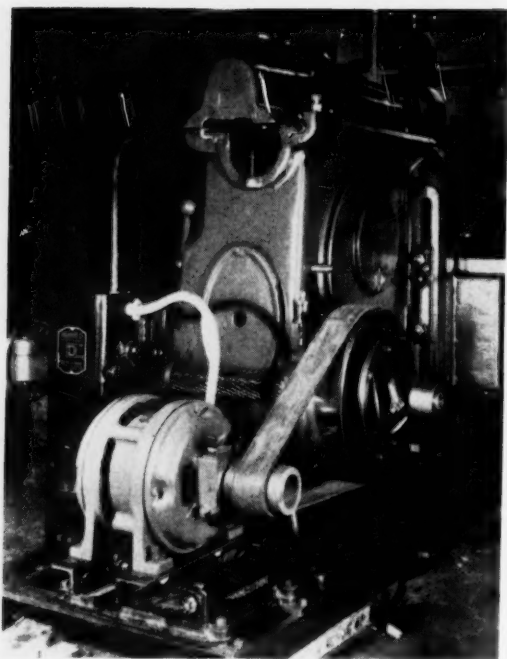
In this illustration is shown a number of drives in the machine shop of a company specializing in gear cutting. Note the drives are from overhead and arranged in groups for most efficient power transmission. Note also the motors suspended from overhead for driving lineshafting. Some of the motors are on automatic-tension bases, the weight of the motor supplying correct tension to the drive. Illustration courtesy E. F. Houghton & Company.

### Dirt and Air Are Trapped

The difficulty is certainly increased, however, by the fact that air and dirt (surrounding air practically always contains a certain amount of dirt) are trapped between the belt and the pulley. A current of air follows a moving belt. This current of air is in some measure drawn in between the belt and pulley continually. On high speed applications, small - diameter pulleys have often had shallow grooves cut around their working face to allow the ready escape of trapped air. Sometimes these grooves will run straight around the pulley circumference and might be spaced anywhere from  $\frac{1}{2}$  to 1 inch apart. Some pulleys have been provided with helical grooves, cut both right and left hand, thus dividing the working pulley face up into areas re-

sembling small diamonds. The idea is always to allow easy escape for any air that might otherwise be trapped, thus eliminating its anti-traction effect.

More recently, better approaches have been made to the problem. One of these is the development of the so-called vacuum pulley. This pulley, used with high speed machines, is provided with a flange at one end. Air outlets are incorporated through the periphery of this flange. The contact face of the pulley has holes in it connecting with the outlet holes in the pulley flange. When this pulley is operating at high speed, air is forced out through the holes at the larger circumference. As this air is continually leaving the flange, it sets up a vacuum effect within the pulley. This vacuum effect inside the pulley provides a drawing or mild



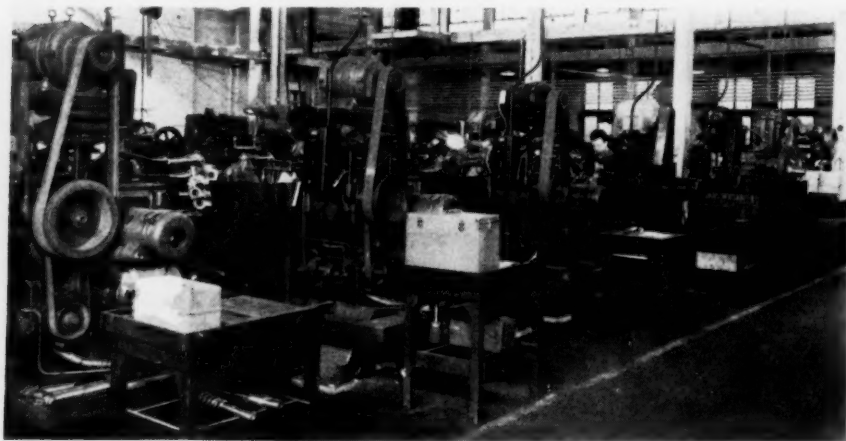
An interesting short-center leather-belt drive to a metalworking shaper. The driving motor is mounted on a pivoted motor base to provide proper tension to the belt. Illustration courtesy American Leather Belting Association.

suction action at the holes in the pulley face with the result that the belt traveling on the pulley is made to maintain close contact.

#### Grooved Leather Belts

One special arrangement in leather belting developed by a leading firm in the power transmission field has to do with pressing a large number of grooves, running longitudinally, into the face of the belting. The resulting effect is somewhat the same as that

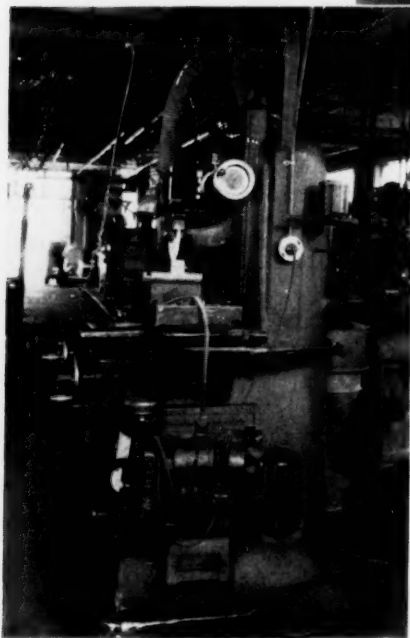
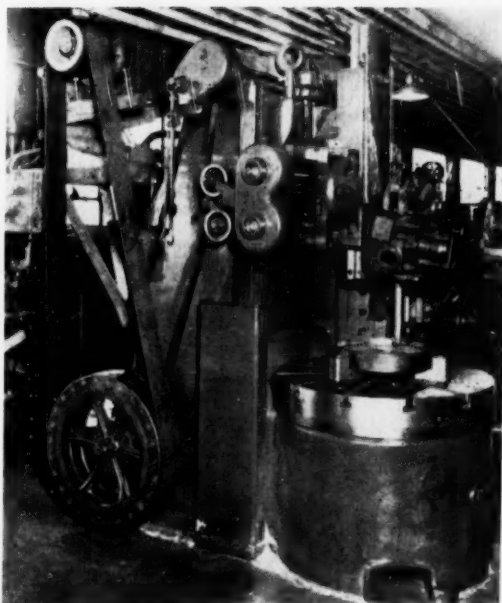
This view shows a row of Warner & Swasey, Gisholt, and Acme turret lathes having leather belt drives used in combination with Rockwood spring-tensioned motor bases. A drive of this type will operate with either flat belts or V-belts and provides the same advantages with either kind of belt drive. Illustration courtesy American Leather Belting Association.



The motor employed on the leather belt drive for this Bullard vertical turret lathe is positioned above and behind the machine on a spring-tensioned pivoted motor base. Illustration courtesy American Leather Belting Association.

of cutting grooves in the pulley. However, flexibility and resiliency in the leather also cause a sort of blowing action through the grooves of the belt which tends to carry away dust and dirt that would otherwise become caked on the belt face and pulley.

Another interesting approach to the problem involves the use of woven endless belts. These belts are woven

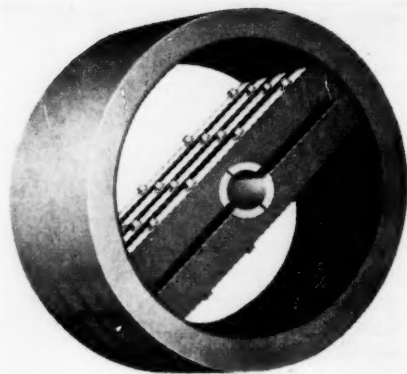


tubular, after which they are pressed flat. They are often used on high speed grinders and small high speed lathes. An interesting sidelight on such belts is that they are sometimes charged with abrasive and used for polishing in the silver and cutlery trades. Where used for high speed power transmission, the woven construction of such a belt allows a considerable amount of air which would otherwise be trapped to pass directly through the belt. Endless woven belts may be of nylon or cotton construction. Some of them are made with practically a selvaged edge to eliminate any possibility of fraying.

The Abrasive surface grinder shown herewith is driven by a Vim Tred leather belt as shown at the top. This type of belt has longitudinal grooves pressed into the leather. Illustration courtesy E. F. Houghton & Company.



In various cases, due to the excellent traction they provide, it is advisable to use split wood pulleys on flat-belt drives. These pulleys have a laminated rim, made of segments double glued and double nailed with cement coated nails. The split bushing shown in the pulley is made of seasoned rock maple. The bolts passing through the tough hardwood hubs afford each hub or arm a separate direct grip on the shaft. Illustration courtesy Menasha Wood Split Pulley Company.

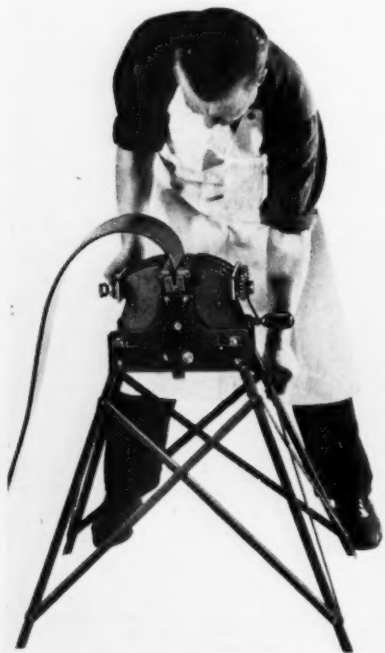


When a flat leather belt becomes dirty, its actual working face is no longer in intimate contact with the pulley faces. Such a belt should be properly cleaned. Never make the mistake of adding belt dressing to an already dirty belt.

Cleaning can be accomplished by washing a belt with naphtha. Some

prefer to use carbon tetrachloride, especially in cases where there is any fire hazard. If a belt is exceedingly dirty, it is wise to scrape off the major portion of the dirt with a blunt-edged scraping tool before washing it. Where flat leather belts are employed, single-ply belts should be used on small-diameter pulleys and double-ply leather belting on larger pulleys only. In specific cases, it is best to rely on recommendations of the belt manufacturer. The smaller the diameter of a pulley which a belt must negotiate, the thinner the belt should be.

In many cases, the use of a single or multiple V-belt drive has been found of particular advantage. Manufacturers of flat belts in many instances also provide V-belts. It is possible that the V-belt drive has received more abuse in general of recent years than flat belt drives. Selection of proper V-belts



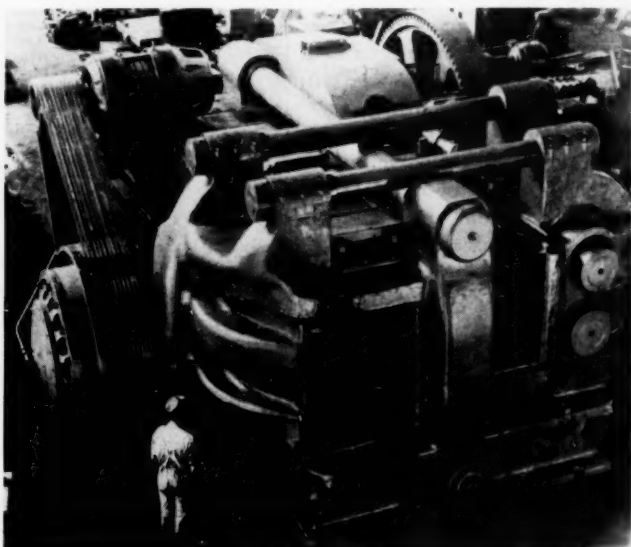
Shown in operation here is a highly efficient belt lacing machine, used for applying multiple belt hooks to trimmed ends of transmission belting, after which the two ends of the belt are connected together with a rawhide pin. Illustration courtesy Clipper Belt Lacer Company.



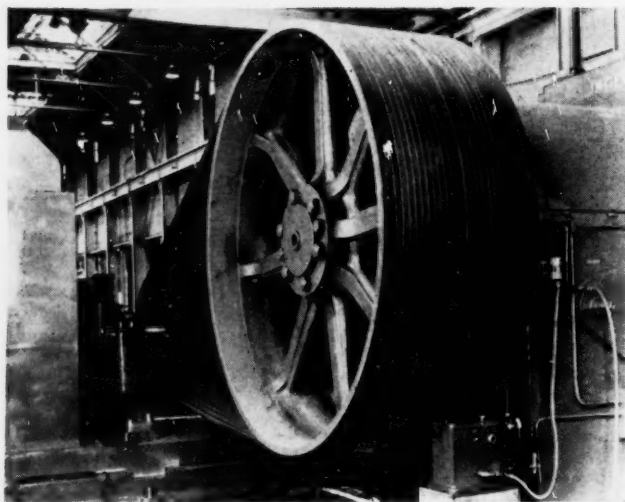
This illustration shows a vacuum pulley. Note the slotted openings in the periphery of the large-diameter flange. These openings connect with the drilled holes in the working face of the pulley and serve to produce a vacuum effect at the pulley face, removing the air cushion otherwise created between belt and pulley at high speed. In this manner, the belt is held firmly to the pulley. Extreme belt tension is not required, and full power of the motor is transmitted to the driven spindle. Illustration courtesy Onsrud Machine Works, Incorporated.

is very important. Installation of the belts and their care are equally important. V-belts may be either under-tensioned or overtensioned the same as a flat belt. However, the inherent wedging action of V-belts in their sheaves allows them to pull efficiently with considerably less tension than is required on many flat belt drives. V-belts should appear snappy on the sheaves in reference to tension, but if run too tightly, they will have relatively short life.

In this illustration a power press is shown being driven by a multiple V-belt drive incorporating 11 belts. This is a huge machine and a huge drive. Sizes can be estimated by noting the operator in the left foreground. Illustration courtesy Raybestos - Manhattan, Inc., Manhattan Rubber Division, Passaic, New Jersey.



Operating V-belts too loose will also shorten their life, since they will slip considerably in their sheaves. This produces rapid wear. On multiple V-belt drives where some belts are shorter than others (as can be observed in some cases where some of the belts run very slack while others appear tight), it is inevitable that a tensional setting cannot be found at which both the longer and shorter belts can be run efficiently. Some of them will be running too tight, some of them too loose, or perhaps both. Matched sets of belts are available from V-belt man-



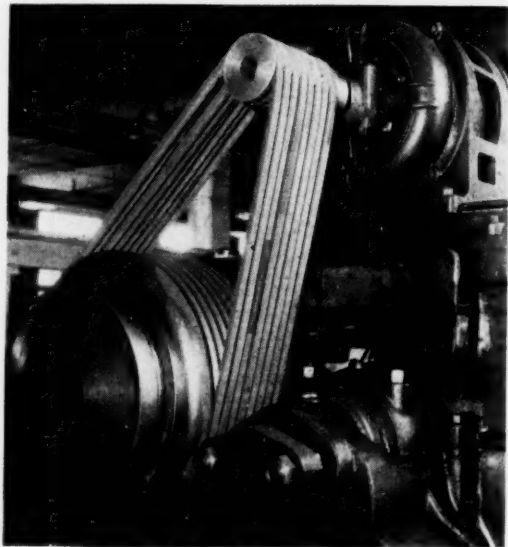
Huge multiple V-belt drive installed on an Ingersoll aluminum scalping machine. The motor is a 500 h.p., 450 r.p.m. induction type, operating on 41,060 volts, a.c. The scalping machine mills the faces of magnesium ingots measuring 76 inches long x 41 inches wide x 11 inches thick and weighing 2,200 lb. each. The motor sheave has a 44-inch pitch diameter and the scalping machine sheave a 109-inch pitch diameter. The drive includes 25 V-belts. Illustration courtesy Worthington Corporation.

ufacturers. Care should always be used to run a matched set of belts on any multiple V-belt drive.

#### Pulley and Sheave Alignment

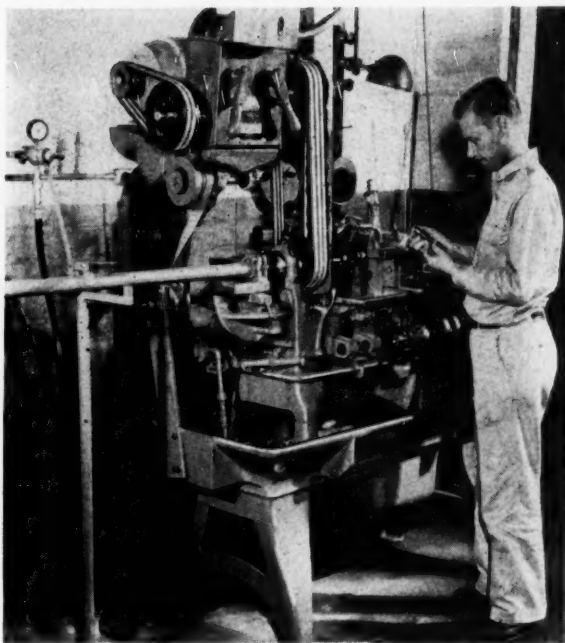
Correct alignment of flat belt pulleys is important, but proper alignment of sheaves in which V-belts run is of even greater importance. If the two shafts on which flat-belt pulleys run are parallel, it makes little difference if the two pulleys are slightly out of line laterally. The flat belt will simply run a little closer to one edge

of one pulley and a little closer to the opposite edge of the other pulley. It is plain that where sheaves are misaligned in this particular respect, however, V-belts running in them will not be able to compensate for the mis-



Multiple V-belt drive on a large lathe provided with a 20 h.p. motor. The eight V-belts shown replaced a gear assembly weighing 1,100 lb., eliminating gear noise, increasing smoothness in machine operation, and lowering maintenance costs. Illustration courtesy Raybestos-Manhattan, Inc., Manhattan Rubber Division.

The turret lathe shown herewith was formerly driven entirely through gears, which were extremely noisy. The old gearbox was removed and a new speed changer was mounted on the bracket above the machine. A V-belt drive was next installed between the motor and the gearbox and another V-belt drive between the gearbox and the lathe spindle. Illustration courtesy The Gates Rubber Company.



alignment in the same manner as a flat belt.

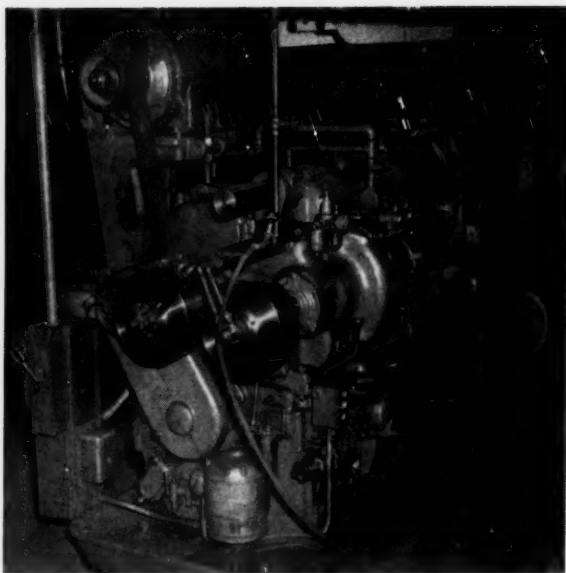
In those occasional instances where a machine driven by V-belts remains idle for considerable periods of time, it is well to turn the machine over by hand occasionally to prevent leaving the V-belts under tension in a given setting. V-belts left standing under tension on pulleys for a protracted period sometimes tend to set to their curved form around the pulleys. Thus, they lose much of their efficiency.

V-belts are nominally trapezoidal in cross section. As they flex around the sheaves in running, they bulge on their sides in some measure. This bulging action is what produces a wedging effect on the sides of the sheave vees, thus increasing pulling power. There is some difference of opinion between different V-belt manufacturers and users touching the degree to which such belts may advantageously bulge during flexing.

Some manufacturers and users maintain that the normal amount of bulging on a straight-sided belt goes

considerably past the point of efficiency, and that too great a portion of the belt, due to the bulging, actually loses contact with the belt sheaves. This contention seems borne out by the fact that many worn V-belts exhibit only a narrow streak along each side which is badly worn. Some manufacturers of V-belts make them with hollow or concave sides. The idea is that the normal bulge of the belt, flexing around the pulley, will neutralize the concavity provided and still provide sufficient wedging action in the pulley sheaves to provide the highest pulling efficiency. Others provide cog-type V-belts, the so-called "cogs" allowing required flexure of the belt without too much bulging effect.

On some drives, it is important to obtain maximum pull from V-belts



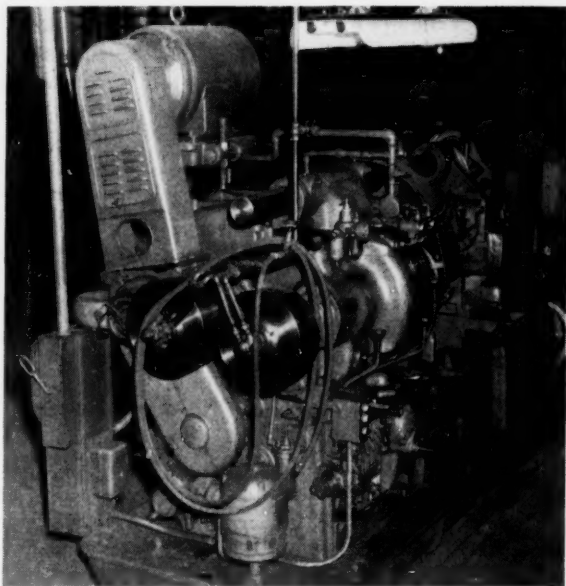
In this illustration is shown a Potter & Johnston Power Flex double-spindle turret lathe equipped with a multiple V-belt drive. The motor shown operates at 750 r.p.m. and is 25 h.p. The V-belts used are of a steel cable type. Illustration courtesy T. B. Wood's Sons Company.

ley and under another, as with a flat belt. Thus, power may be delivered to more than one pulley and from both sides of the belts used.

Early V-belts were all endless and could therefore be applied only to drives of open-end type. For a considerable length of time,

without any stretch taking place. To meet these conditions, some manufacturers have developed V-belts with grommets running through their length. In some cases, V-belts are provided which have steel cables running through them to prevent stretch. So-called double-angle V-belts are now available, as well. These belts make it possible to run a V-belt over one pul-

this limitation has been overcome. Belts now available from various



View of Potter & Johnston double-spindle turret lathe with an attractive and efficient V-belt guard applied over the drive. Illustration courtesy T. B. Wood's Sons Company.

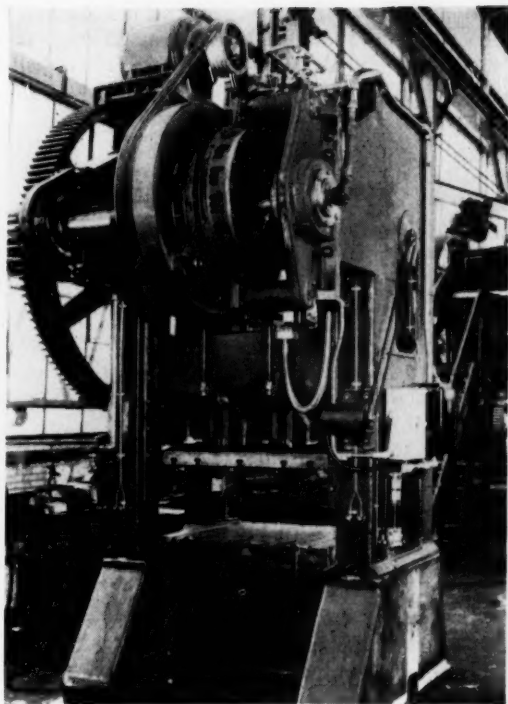
In this illustration, a Bliss punch is shown being driven by four grommet V-belts. The punch press is of 200-ton capacity. To operate properly on a drive of this type, belts must withstand shock loads, high starting torques, and harmonic "whip" characteristics of a punch press drive. Illustration courtesy The B. F. Goodrich Company.

sources are made up of links. These links are often made of the same general materials, and laminated in the same general way, as flat rubber belts. The links are provided with studs and holes in such a manner as to allow them to be coupled together.

#### **Applicable to Closed-End Drives**

Because of this, it is possible to thread the ends of such a belt through a closed-end drive of any kind and couple it together. Such a belt is also adjustable for length and tension by adding or removing a link as the need arises. Many large plants keep a reasonable amount of link-type V-belt on reels in a number of widths. This allows the user to make up a belt of any required length from any standard width at any time.

Link-type belts have certain additional advantages. Their extremely flexible laminated construction protects the belt against bending stresses. They are also cooled by direct air circulation, since the belt is not encased in an outer covering, which of necessity is used on an ordinary V-belt. Thus, internal heat otherwise caused by bending and flexing is dissipated. Some feel that a link-type belt is also



particularly suitable for drives where it must be twisted in some degree and even for quarter-turn drives. Some of these belts have been developed in a special size to provide an accurate sheave fit on No. 2 centerless grinders.

In plants where it is desired to use endless V-belts, yet hold belting inventory down to a reasonable figure, it is good practice to watch the installation of all multiple V-belts in the plant, with the idea of using the same length V-belts on as many drives as possible. In this manner, the number of different lengths of V-belts required can be greatly reduced. As a direct consequence, relatively few V-belts need be kept in stock as replacements.

Open-end V-belt may be obtained



from different manufacturers, and special V-belt fasteners may be used for connecting V-belt ends in many cases where conventional endless belts cannot be used without dismantling drives or equipment. This type of belt is quite often employed on a lineshaft drive and on other drives where V-belts are of considerable length and where travel is not so fast that the joint would adversely affect proper running balance.

While V-belts enable power to be efficiently transmitted between pulleys located on short centers without the use of a belt tightener, it is nevertheless practical, whenever necessary, to provide a mild tightening action with a belt tightener pulley, either in the form of a spring-loaded or gravity idler. The fact that V-belts may be operated efficiently on relatively short pulley centers should not be pushed too far. Since V-belt manufacturers have facilities for checking lengths of fin-

ished V-belts precisely and have adopted a system of marking belts which allows the selection of belts matching very closely for length, the user should always select belts that are properly matched for running together on the same multiple drive.

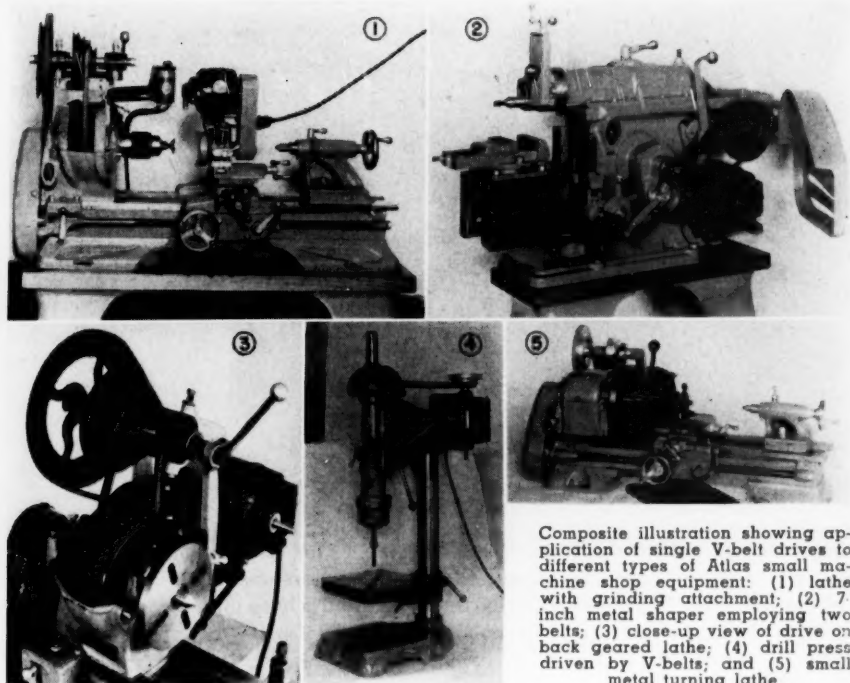
The longer endless V-belts are made, the easier it is to match them properly since a given difference in length between two belts is less serious on longer belts than on shorter ones. If, for any reason, it is desired to use V-belts on very short center drives, the belt manufacturer should be consulted as to the shortest center drive and the smallest-diameter pulley for which he will guarantee efficient performance of his belts. So-called cog-belts, it is claimed, can be employed to advantage on pulley-center spans considerably shorter than standard V-belts.

#### Mount V-Belts Carefully

Because the edges of V-belt sheaves are always greater in diameter than the position on the sheaves at which V-belts operate, such belts should not be pried or turned over edges of pulleys in the same manner flat belts are often mounted. It is easy to damage or



The machine shown in operation here is a gear grinder, used in connection with airplane engine manufacturing. The multiple V-belt drive shown does an excellent job of power transmission in connection with this operation. Illustration courtesy The Dayton Rubber Company.



Composite illustration showing application of single V-belt drives to different types of Atlas small machine shop equipment: (1) lathe with grinding attachment; (2) 7-inch metal shaper employing two belts; (3) close-up view of drive on back geared lathe; (4) drill press driven by V-belts; and (5) small metal turning lathe.

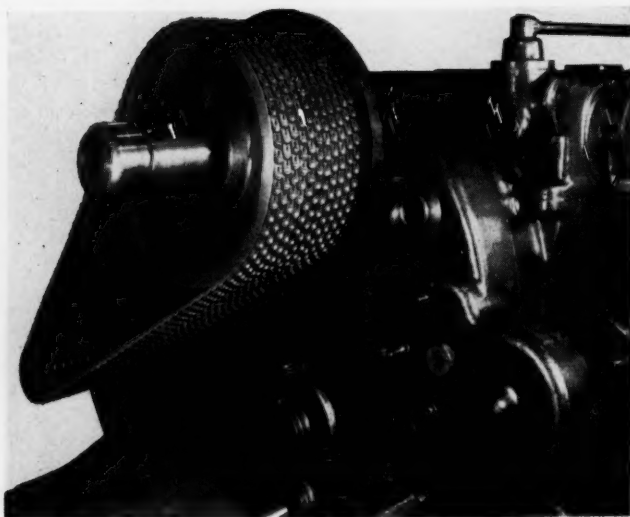
break one or more cords in a V-belt by this practice. Wherever a cord is broken in a belt, its life will be reduced.

Wherever possible, a V-belt drive on which endless belts are used for transmitting power between a motor and machine should have the motor placed near the forward end of its adjustment at the time the V-belts are first placed on the sheaves. The belts should fit loosely when being placed on sheaves in this position. Thus, all the adjustment present in the motor take-up is available for tightening the belts. This practice permits belts to be placed on or removed from sheaves without forcing them unduly.

Any belt drive, whether flat or V-

belt, may be checked for continued efficient performance through the use of a tachometer. As soon as an installation has been made and the driven shaft speed is what it should be, the user should check the speed with a tachometer and make a notation of it in a convenient location. Thereafter, the user can check driven-shaft speed as often as he cares to do so, comparing it with the original tachometer reading. If at any time the driven shaft shows a lower speed, it indicates that an adjustment for increasing belt tension is in order. Flat belts stretch slightly over a period of time and require taking-up.

On V-belts, a certain amount of wear occurs, which increases effective belt



The special universal turret milling machine shown here, manufactured by a leading maker of aircraft machinery, is driven by link-type V-belts. Illustration courtesy Manheim Mfg. & Belting Company.

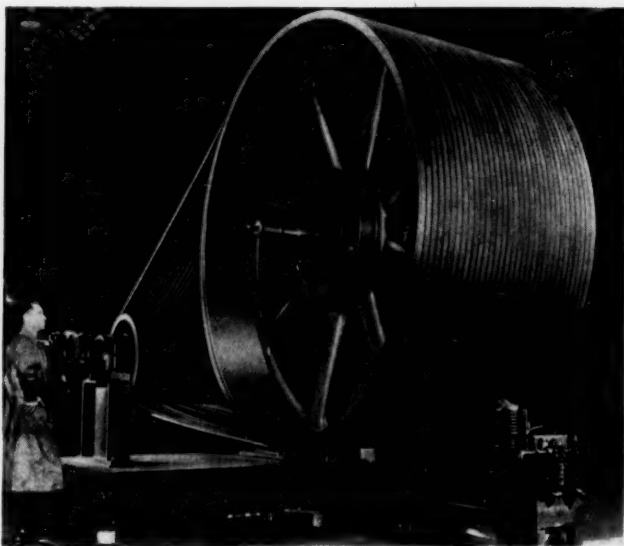
those joined with fasteners have different stretch characteristics. Therefore, they should never be used together. They will never permit uniform

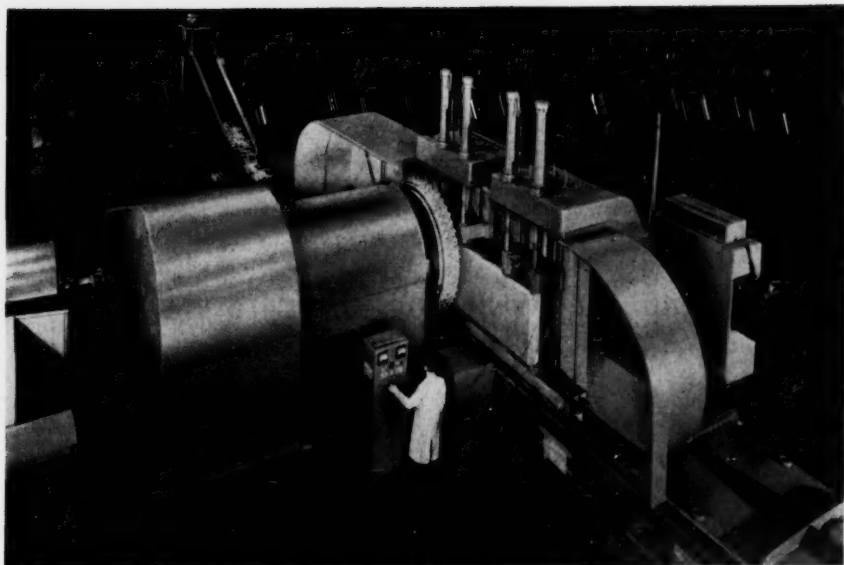
length. There is also some initial belt stretch, for which take-up is required. On any multiple V-belt drive, particular care should be exercised to keep all belts the same length as far as consistently possible. Remember that V-belts of the endless type and

distribution of the load between the two types of belts involved.

Again, where one or more belts in a multiple V-belt drive have gone bad for any reason, it is very poor prac-

The huge multiple V-belt drive shown herewith is in use at a midwestern plant of Aluminum Company of America on an Ingersoll aluminum scalping machine employed to remove outside impurities from huge aluminum ingots before they are sent to rolling mills. The large sheave on this drive has a pitch diameter of 108 inches, and the smaller sheave has a 30-inch pitch diameter. Thirty-two V-belts are used on this drive. Illustration courtesy Allis-Chalmers Mfg. Co.

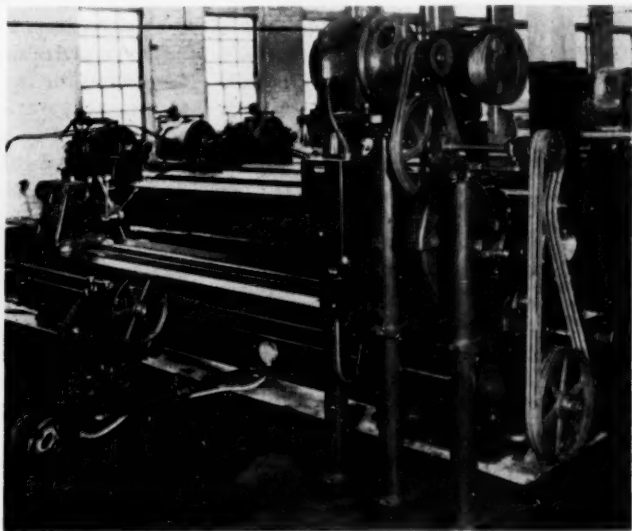




View of giant aluminum scalping machine on which huge multiple V-belt drive is used. Illustration courtesy Allis-Chalmers Mfg. Company.

tice to replace one or two belts with new belts and leave older belts still operating in the drive. The old belts are well stretched! The new belts are as yet unstretched and will be slightly shorter due to this factor and also because they have

as yet received no wear. As a result, the new belts will be taking more than their part of the load.



This illustration shows a gun boring lathe equipped with a number of V-belt drives. Note how a tightener pulley is used against the drive at the extreme right. This device also serves to increase the arc of belt contact on the pulleys. Illustration courtesy Browning Mfg. Company.

# An Effective Safety-Training Program . . . . .

By ALFRED M. COOPER

*An outline is provided for efficiently instituting such a program in a machine shop.*

To a greater extent in the machine shop field than in any other industry, management appreciates the value of effective programs of accident prevention. One practical reason for this is that good all-round machinists and tool and diemakers are none too plentiful and, when a shop acci-

a serious accident that will involve others who rank as highly skilled workmen.

In conducting safety training programs in factories, machine shops, and public utility organizations, I have found that any such program, to be successful, must have for its **first objective, the securing of the fullest voluntary cooperation of every employee of any department in which accident-prevention training is in effect.**

When the immediate supervisors in that department (foremen, assistant foremen, and straw bosses) participate directly in the program, the possibility of such cooperation is greatly increased. Particularly is this the case when supervisors of this type are trained to lead safety meetings, perhaps by conference method.

However, even though safety training is conducted by instruction from the plant training organization, it is imperative that the supervisors attend all meetings of this type and are thoroughly familiar and in sympathy with the objectives of the instructors. It is a fact that a careless, derogatory remark dropped by a supervisor may neutralize the beneficial effects of any such training program, even though



"... its first objective, the securing of the fullest voluntary cooperation of every employee of any department in which accident-prevention training is in effect."

dent occurs, it may, like as not, involve an almost irreplaceable skilled artisan of this type, even though he happens to be but an innocent bystander. It is a fact that the best-intentioned of helpers or laborers may be the cause of

the accident-prevention instruction has been properly planned and executed.

Because of this fact and because, in the final analysis, it is up to the supervisor to see to it personally that safety rules are enforced on the job, I have often found it advisable to train these supervisors as effective conference leaders and thereafter turn over to them the actual conduct of the accident-prevention meetings with their own subordinates. The best method of doing this is to proceed as outlined in the following paragraphs:

**1. Not much may be accomplished by lecturing or haranguing competent artisans regarding safe working practices.** The truth is that this approach does not get very good results with any type of worker. But when the employee is a highly skilled workman, such as a machinist or tool and die-maker, it may be assumed that he already knows most of the answers to accident prevention as this applies to his own job, and the trainer's job is that of developing discussion as to the best methods of avoiding injury and eventually persuading the group to work out definite procedures in these matters.

About the only choice you have here is between having someone lecture to these men, telling them how to work safely, or to lead a discussion with them and let them tell the leader and each other how to work safely. My experience leads me to believe that the latter method is preferable, since a group of 20 to 30 men who have been working on highly skilled jobs for many years know more about safe working practices in their department as a group than can any single safety expert.

2. Appreciating this fact, the administrator of such a safety program knows that lecturing to men of this type probably constitutes a waste of time. What he has to do is to devise a simple, workable plan for getting them to pool their ideas on this subject and thereafter encourage them to agree



"Not much may be accomplished by lecturing or haranguing competent artisans regarding safe working practices."

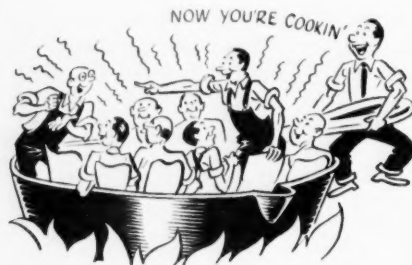
upon the best methods of accident prevention under various sets of circumstances.

The particular factors in any safety problem are outlined in the statement of the case and thereafter all discussion is confined to that particular problem until group consensus has been obtained. General agreement is not too difficult to arrive at, but, on certain points, differences of opinion are likely to become quite sharp. I have always encouraged the fullest expression of such differences of opinion, feeling that a **red-hot discussion is much more effective than a tame, sedate, and often boring session** in which everybody is in agreement from the beginning—and privately wonders why the meeting ever was called.

The only types of safety meetings worse than the too-amicable discus-



sions are the out-and-out lecture and that form of post mortem in which the idea is to try to pin the blame for some past accident on one of the individuals



"... a red-hot discussion is much more effective than a tame, sedate, and often boring session . . ."

in the group. In the first instance, the employee may be excused for seizing the opportunity to take a short snooze or in concentrating mentally on something to do with the job he was working on at the time he was called into the meeting. In either instance, he does not get much out of the session.

If the object is to affix blame on a worker for an accident that has occurred, about all the leader can accomplish is to create a lot of unnecessary antagonism. That accident is water over the dam, and a group of safety engineers might study it for hours and not be able to agree on who was at fault. The purpose of any safety training program is to prevent accidents from occurring in the future, and nothing is gained by rehashing past mishaps, except as the group members wish to refer to certain of those to prove points they bring up in the discussion.

**3. An effective safety training program can be conducted in a series of 12 carefully prepared conferences.** These meetings must bring about a

genuine, marked reduction in accident rates, both as to frequency and severity, if the group is to become sold on their efficacy. Such a series of meetings may be repeated whenever the administrator of the program later finds it advisable to bring up further subjects for discussion, but any additional conferences should contain altogether new material and not constitute rehashing of discussions already completed.

All safety meetings should, of course, be held on company time. I have found the best length for each meeting to be about one and one-half hours. The men are taken from their jobs in such rotation as to interfere least with production. A lecture on safety may be delivered in 30 minutes. A discussion requires more time, but gets results unknown to those dependent on safety talks. On occasion

I have conducted such discussions for as long as two and a half hours — particularly when the accident rate in a plant had reached astronomical proportions and management was determined that something must be done about the matter, and at once. Even such a long conference seems to pass

quickly if everybody present is genuinely interested and is taking an active part in the discussion; whereas a boring discussion or lecture may seem



"An effective safety training program can be conducted in a series of 12 carefully prepared conferences."

an endless affair to everybody in attendance.

4. Whether any safety meeting is boring or intensely interesting and resultful depends entirely upon the leader of the meeting. Again, this matter of interest (the most important element in any conference) depends upon how much the leader knows about conducting conferences and how much thought he

has given to the subjects that are to be discussed in a particular session. This in turn brings up the question of who is to lead these meetings. **There are three possibilities here.** In instances in which the safety engineer is genuinely qualified to conduct resultful discussions, he may be chosen for this job. Again, there may be one or more men in the plant training division who are thoroughly qualified to teach, not by lecture, but through leading conference discussion concerning safety problems.

Finally (and I have found this to be often the most effective method of all), the immediate supervisor of a group of shop employees may readily be trained to lead safety discussions that will bring about a sharp reduction in accidents. It has been determined that such a supervisor, who may not be able to make a prepared speech to save his life, has little difficulty in getting a group of his subordinates to talk and thereafter permit these people to arrive at intelligent conclusions

during conference periods.

When the supervisor is to be utilized as a safety trainer, there is another advantage gained; namely, that he is the only man who is in a position to see to it that the procedures agreed upon in any meeting are actually put into effect on the job. Also, any supervisor is going to be thoroughly in sympathy with any course of training in which he acts as instructor. And the group members, having always looked to this supervisor for suggestions concerning their work, consider him to be their natural instructor.

5. Regardless of who is chosen to lead the meetings, the material for discussion is about the same, and this subject matter may best be determined by the group itself. Groups are limited to about 30 in attendance. The men are comfortably seated about a table. The leader has a blackboard available, together with adequate crayons and eraser. At the opening of the first session, the leader speaks for not more than three minutes, outlining the general purpose of the series of conferences, and explaining that these meetings will be held but once a month. He then puts his first question to the group. This is: **"What are the principal underlying causes of accidents that occur in our department?"**



"There are three possibilities here."



"What are the principal underlying causes of accidents that occur in our department?"

The replies to this query are at first slow in coming; then, as the group gets the idea, they come so fast that the leader has difficulty in getting them down on the blackboard without repetition. Usually, the first response is "Carelessness" or "Negligence," which may be followed by "Worry,"



"The general subject will be, say, "Negligence," and nothing else is to be discussed at that meeting."

"Working too fast," "Defective equipment," and many others. As a rule, this preliminary list runs up to about 40 underlying causes.

It is after this list has been developed that the real discussion in that meeting begins. The leader next asks the group, "Which one of these underlying causes is responsible for most of the accidents that occur in our department?" It will be found that the group will differ widely as to the No. 1 cause, and the discussion may continue heated until consensus has been obtained on the top four causes. Thereafter, the lesser causes are more quickly arranged in an order of importance. The leader should encourage a red-hot discussion, for it is such sharp difference of opinion that later produces carry-over to the job, and this is absolutely essential as a result of any safety meeting.

This order of importance establishes the course of instruction for that group. Thereafter, the No. 1 underlying cause (usually agreed upon as "Carelessness" or "Negligence") is announced as the subject for discussion at the next meeting.

6. Before the second round of meetings in that department, the leader, or the man in charge of the training program, must prepare a series of genuinely thought-provoking discussion questions for presentation to the group. **The general subject will be, say, "Negligence," and nothing else is to be discussed at that meeting.** The exact working of these questions calls for quite a bit of thought, since each must stir up plenty of discussion. A question upon which the group members agree at once has no value in getting the men to thinking hard on methods of preventing accidents. Perhaps the best type of question is one offering an alternative to the group and insisting that a choice be made between two concrete procedures.

The best method I have found for training factory supervisors as conference leaders is that of permitting them to hold conferences. It works out about like this: In each department the supervisors are brought together in a preliminary meeting, at which the administrator explains to them how the program is to be conducted and what their part will be in it. In this meeting it may be expected that a certain amount of opposition to this proposed extra duty will be expressed. Also, there will be issued to each supervisor a text (perhaps mimeographed) covering the highlights of proper procedure in leading any type of conference.

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A week later a second meeting with these supervisors will be called, which may be considered as the first "rehearsal" meeting of this safety training program. In this meeting the administrator actually leads a discussion on safety training, in which the supervisors act as the group, develop the underlying causes of accidents, and arrange them in order of importance, as earlier outlined. The supervisors are informed in advance that they are to lead this identical conference with their own subordinates, and they will therefore watch carefully the methods of promoting discussion employed by the administrator (perhaps the plant's educational director). At the close of this meeting, general discussion is permitted regarding best methods of handling this meeting, after which a detailed conference plan is issued to each supervisor to aid him in properly conducting that first employee conference of his. This plan covers the conference just conducted by the administrator and adds much to the supervisor's confidence when he faces his own group.

7. Thereafter, over a period of one month, each of these supervisors holds a meeting with his subordinates. In it he discusses the material we have already covered under point 5. This meeting is a "natural" and the supervisor will experience little difficulty in developing the list of underlying causes and in arranging these in their order of importance.

Usually, he will hold but one 1½-hour meeting per month and devote 2 hours monthly to attendance at the rehearsal meeting—a total of 3½ hours will thus be given to this activity. If he has many men reporting

to him, he may find it necessary to conduct two such meetings monthly with different groups.

Whenever possible, his meetings will be observed by the head of this program, or a representative of his, and a critical report will be made to the supervisor in writing, discussing his successful technique and any errors he may have made in handling the meeting. Thereafter, at each rehearsal meeting, the supervisors devote at least half an hour to discussion of their experiences in leading these conferences. Between participating in these "rehearsed" discussions and actually leading their employee meetings, they quickly develop into effective conference leaders.

The critical comments of the observer also help. This observer is instructed to take no part in the meeting at any time. Also, while this is of less importance, no conference leader ever is referred to as a "moderator," since this term is considered misleading. The function of any conference leader is that of stirring up a genuine difference of opinion between group members and not that of serving to "moderate" anything. **Hot discussion gets lasting results;** there is never any advantage gained by conducting a lady-like consideration of subjects pertaining to this serious matter of accident prevention.

8. The administrator prepares the specific discussion questions for



"Hot discussion gets lasting results . . ."



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"Round 2" in which all discussion will be confined to the top underlying cause of accidents as earlier chosen by this group. After the supervisors have successfully led two conferences, there will be heard no further opposition to their acting as instructors with their own subordinates; indeed, it would



"Some samples of discussion questions on 'Negligence' that have proved successful in conducting Round 2 . . ."

then be difficult to substitute anyone else as conference leader for that group.

Some samples of discussion questions on "Negligence" that have proved successful in conducting Round 2 follow:

1. What are some of the things a worker might do in your department that you would consider negligent?
2. What is the difference between negligence and criminal negligence?
3. Under what circumstances is a supervisor responsible when a subordinate is negligent? When is the supervisor not responsible?
4. It is known that an employee neglects to use proper safeguards while working, but no accident happens. In another case, the employee

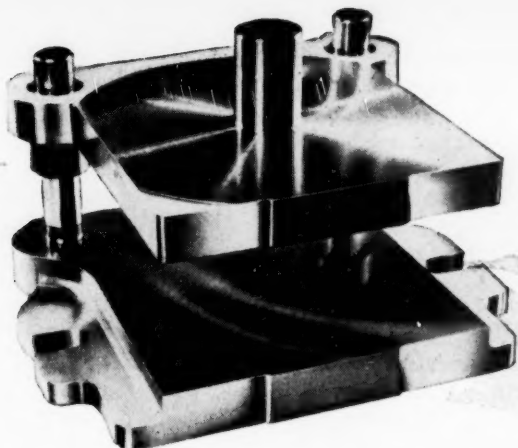
neglects to use proper safeguards and causes a costly accident to equipment. Should there be any difference in the action of management in handling these two cases?

5. What is the best way to cure an employee who is habitually negligent of his safety and that of others?

These illustrative questions will suggest many others to the administrator, any one of which will develop a hot discussion. The executive's intimate knowledge of the department's work will help him in preparing good discussion questions for each underlying cause. Once in a great while it will be found that one of the supervisors simply cannot get the hang of leading discussion. After a thorough try-out, this man must be substituted for in this activity by another—perhaps his own assistant supervisor, who may well make an excellent conference leader.

In leading any discussion, the man at the head of the table will do well to bear in mind seven points, in addition to following the general conference plan furnished him at each meeting. These are:

- a. The leader must repress his desire for self-expression. He must limit his participation to 20 per cent or less of the total talking done; his participation should be only in the form of questions that are not leading, either in wording or inflection.
- b. No one must be allowed to hog the discussion. The group should be asked not to permit one or two to speak for them. If this doesn't work, the talkative ones must be reminded to give somebody else a chance.
- c. The leader should not worry about the silent group members. As soon as



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the discussion gets sufficiently interesting they won't be able to keep out of it.

d. The discussion must be kept on the subject at all times.

e. The discussion must be interesting. Carefully prepared questions, supported by thoughtful, properly timed follow-ups, will take care of this.

f. A laugh should be put into the discussion once in a while; it relaxes the group and relieves tension. However, the leader should not attempt to do this by telling a funny story. The humor should develop from the discussion itself.

g. Occasionally, the ideas that have been developed should be summed up by the leader, and the discussion allowed to proceed from there. At the close of the discussion of each question, a final summation should be made and a vote taken on the question under discussion, thereby pointing up the fact that something worth-while has been accomplished.

The follow-up questions mentioned in "e" are extremely important. They differ from the principal discussion question in that they must be wholly extemporaneous. Their purpose is to encourage the group to get to the bottom of the question under discussion, rather than to give the problem but superficial consideration. Follow-up questions must be short, fit directly into the discussion, and result in a noticeable increase in interest. The best one I have ever employed is "Why?"

The general procedure after the first round of meetings will be a rehearsal meeting monthly, followed by a series of employee conferences on safety conducted at some time during

the ensuing month—each employee attending one meeting. Thus, the top underlying cause of accidents becomes the subject of discussion for one month, and the other causes follow in the order of importance established by the group.

About the second or third meeting, the supervisors will be able to report to their subordinates a genuine reduction in accidents in that department. Thereafter, this reduction will become more marked at each meeting. In one such organization in which this program was instituted, the drop in the frequency rate amounted to 62 per cent with-

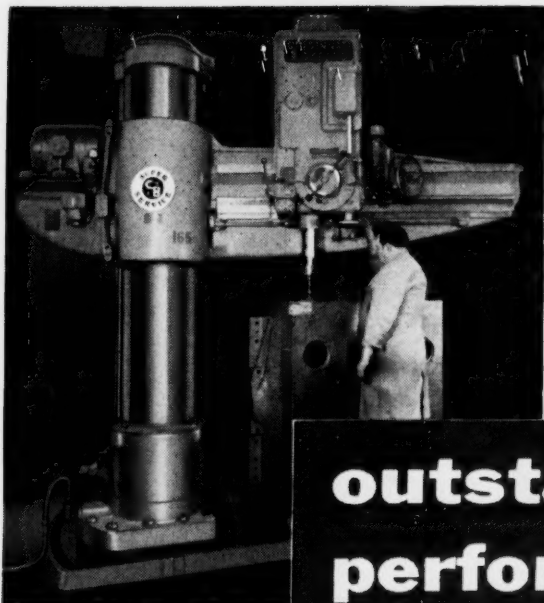


"... the drop in the frequency rate amounted to 62 per cent within six months ..."

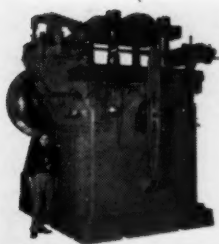
in six months, while the severity rate was reduced by 88 per cent as compared to the previous six-month period. Fatalities simply ceased to occur. These figures are taken from the annual report of the organization for that year.

Results half as good as these will be acceptable in any plant, and the results, when made public, act as the most powerful motivation conceivable in persuading the supervisor and his subordinates to give their best efforts in making this safety program altogether successful.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



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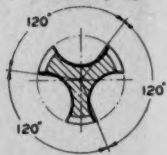
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*Continued*



# Collective Bargaining in the Machine Shop

By ROBLEY D. STEVENS\*

*In discussing this subject, the author explains why foremen as part of management should understand numerous aspects of industrial relations.*

ONE of the perplexing problems facing machine shop foremen and supervisors today is that of collective bargaining, which has become the cornerstone of our national labor policy. Most foremen and supervisors in their positions of responsibility have, in a way, two jobs, the first of which is to get out machine shop production. Their second job is to "supervise" workers—to get them to do the best they are capable of doing. However, where collective bargaining has been established in the machine shop, the foreman's role is no less important.

There are about 60 million people in the United States employed. Of that number approximately 16 million belong to unions, and practically all of the 16 million union members work under contracts which have been entered into as a result of collective bargaining. In fact, approximately 8 million production workers in manufacturing are deemed to be covered by collective bargaining contracts, and about 50,000 collective bargaining contracts are in effect today.

The foreman or supervisor in a ma-

\* Management Consultant.

chine shop should understand what is meant by the term "collective bargaining." There are, of course, many definitions, but all are essentially the same. In a general way, collective bargaining is, therefore, a method by which a joint agreement is reached between labor and management.

The Labor - Management Relations Act of 1947 (Taft-Hartley Act) guarantees the right of workers in machine shops to organize and to bargain collectively with their employers or to refrain from such activities. It also provides that foremen are not subject to the Act which says: "Supervisors having authority, in the interest of the employer, to hire, transfer, suspend, lay-off, recall, promote, discharge, assign, reward, or discipline other employees, or responsibility to direct them, or to adjust their grievances, or effectively to recommend such action, if in connection with the foregoing the exercise of such authority is not of a merely routine or clerical nature, but requires the use of independent judgment."

Since collective bargaining is the law today, the foreman or the supervisor

UNITED STATES OF AMERICA  
NATIONAL LABOR RELATIONS BOARD  
**CHARGE AGAINST EMPLOYER**

IMPORTANT--READ CAREFULLY	DO NOT WRITE IN THIS SPACE
Where a charge is filed by a labor organization, or an individual or group acting on its behalf, a complaint based upon such charge will not be issued unless the charging party and any national or international labor organization of which it is an affiliate or constituent unit have complied with section 9 (f), (g), and (h) of the National Labor Relations Act.	Case No. _____
INSTRUCTIONS.--File an original and 4 copies of this charge with the NLRB regional director for the region in which the alleged unfair labor practice occurred or is occurring.	Date Filed _____
	Compliance Status Checked By: _____

**1. EMPLOYER AGAINST WHOM CHARGE IS BROUGHT**

NAME OF EMPLOYER _____	NUMBER OF WORKERS EMPLOYED _____
ADDRESS OF ESTABLISHMENT (Street and number, city, zone, and State) _____	NATURE OF EMPLOYER'S BUSINESS _____

The above-named employer has engaged in and is engaging in unfair labor practices within the meaning of section 8 (a), subsections (1) and \_\_\_\_\_ of the National Labor Relations Act, and these unfair labor practices are unfair labor practices affecting commerce within the meaning of the act.  
(List subsections)

2. Basis of the Charge (Be specific as to facts, names, addresses, plants involved, dates, places, etc.) \_\_\_\_\_

**3. Full Name of Labor Organization, Including Local Name and Number, or Person Filing Charge**

4. Address (Street and number, city, zone, and State) _____	Telephone No. _____
5. Full Name of National or International Labor Organization of Which It is an Affiliate or Constituent Unit (To be filled in when charge is filed by a labor organization) _____	

6. Address of National or International, if any (Street and number, city, zone, and State) _____	Telephone No. _____
--	---------------------

**7. DECLARATION**

I declare that I have read the above charge and that the statements therein are true to the best of my knowledge and belief.

By \_\_\_\_\_  
(Signature of representative of person filing charge)

(Date) \_\_\_\_\_

(Title, if any) \_\_\_\_\_

WILLFULLY FALSE STATEMENTS ON THIS CHARGE CAN BE PUNISHED BY FINE AND IMPRISONMENT (U. S. CODE, TITLE 18, SECTION 80)

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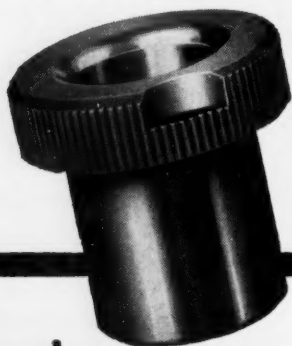
in a machine shop ought to be familiar with section 8(d) which provides: "For the purpose of this section, to bargain collectively is the performance of the mutual obligation of the employer and the representative of the employees to meet at reasonable times and confer in good faith with respect to wages,

hours, and other terms and conditions of employment, or the negotiation of an agreement, or any question arising thereunder, and the execution of a written contract incorporating any agreement reached if requested by either party, but such obligation does not compel either party to agree to a



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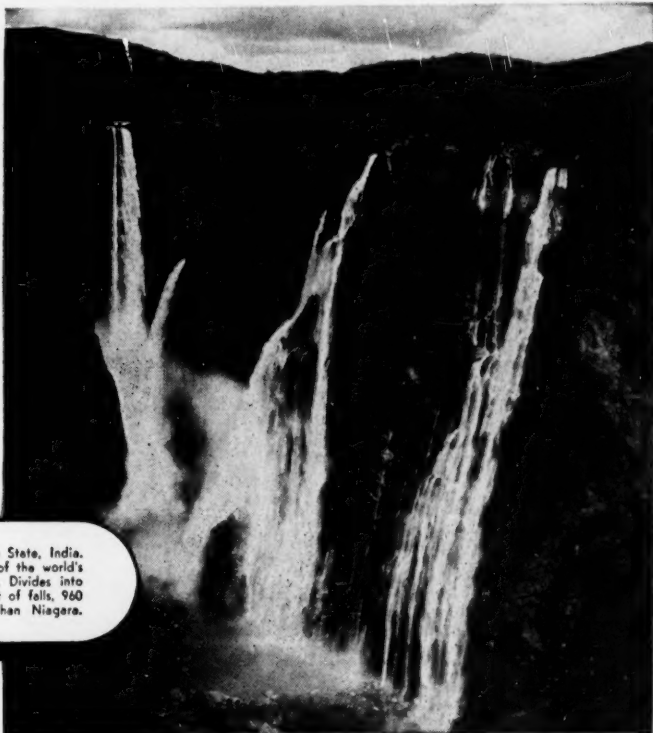
proposal or require the making of a concession."

In other words, the foreman in a machine shop has the definition of collective bargaining as cited in the law itself. On the other hand, the foreman in a machine shop should understand that employers are forbidden to engage in any of the five unfair labor practices listed below. Section 8(a) provides: "To interfere with, restrain, or coerce employees in the exercise of the rights guaranteed in Section 7. Following are examples of employer interference which have been forbidden: (a) threatening employees if they should join a union; (b) questioning employees as to their union activities or membership; (c) spying on union gatherings; and (d) making wage increases deliberately timed to defeat self-organization among employees. All of this information should be helpful to the foreman or supervisor in a machine shop for obvious reasons, because established basic rights are presented therein.

The need for learning the salient features of the law does not stop there, since the foreman or a supervisor in a machine shop ought to understand Section 8(c) which provides: "The expressing of any views, argument, or opinion, or the dissemination thereof, whether in written, printed, graphic, or visual form, shall not constitute or be evidence of an unfair labor practice under any of the provisions of this act, if such expression contains no threat of reprisal or force or promise of benefit." This fact should not and must not be overlooked for obvious reasons.

There are several distinct and well-defined types of collective bargaining which the foreman or supervisor in a

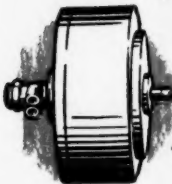
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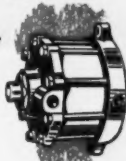
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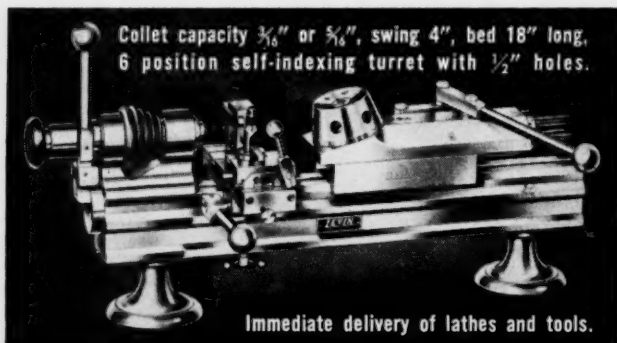


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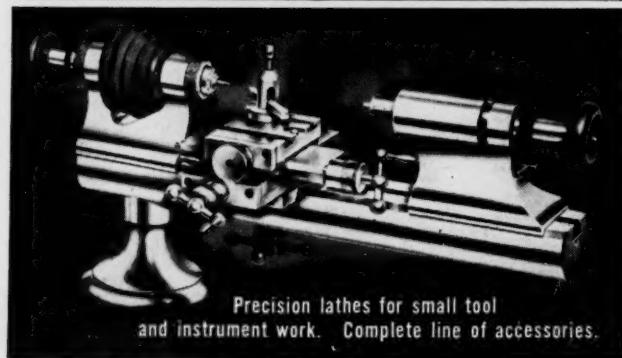
machine shop should understand. For example: (a) single-plant bargaining, (b) company-wide bargaining; (c) industry-wide bargaining, (d) area-wide bargaining, and (e) multi-union bargaining. Generally speaking, collective bargaining involves what is known as "horse-trading." Whether this is unscientific or not, since our economy is a cooperative undertaking, many groups use it.

Collective bargaining provisions are of interest to the foreman or supervisor in a machine shop for numerous reasons since they are as important to management as to organized labor. For example, the understanding of some of these provisions gives rise to the foreman's working knowledge and helps him out in many ways. Take the matter of incentive wage provisions that has been interpreted as a

method of wage payment by which workers receive extra pay for extra production. The foreman in a machine shop ought to understand that incentive wage plans are designed to encourage the fullest possible use of individual ability and thereby to increase individual productivity. Such plans may vary from machine shop to machine shop. However, the simplest form of incentive wage payment is straight piecework, whereby workers are paid a fixed amount per piece produced. Unlike individual incentive plans, under which individual



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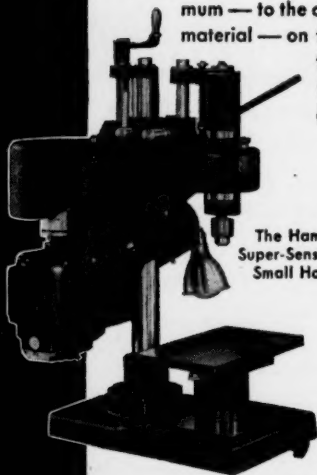
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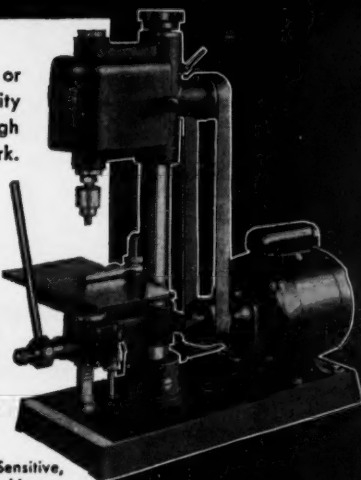
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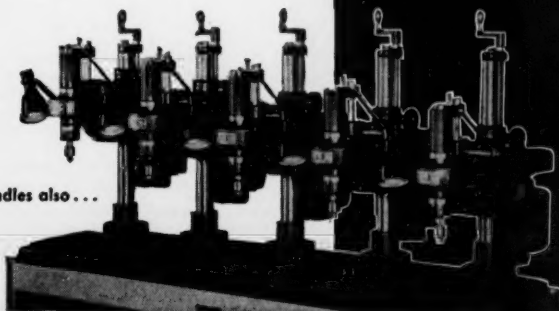


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earnings fluctuate with individual output, group incentive plans tie an individual's earnings to the output of the group as a whole.

Employers in the free American enterprise system generally favor incentive wage plans because they are assured of relatively stable unit labor costs and greater employee efficiency and productivity. According to some management experts, it is unfair to pay the same wage to a slow worker as to a more efficient one, and a system which rewards the individual worker according to his skill and industry is therefore both more equitable and more desirable, as the foreman or supervisor in a machine shop can readily understand.

Collective bargaining agreements include a wide variety of provisions pertaining to incentive plans. The use of

a piece-rate or incentive system involves the problem of determining the proper rate per piece or unit of output or the determination of production standards. Some agreements set up special procedures for fixing and revising rates, specify the conditions under which rates may be revised, and provide that rate changes shall be proportionate to the change in job content.

A common method of assuring incentive workers minimum earnings is the establishment of a guaranteed minimum wage, below which the earnings of no incentive worker can fall. In some cases, employers often insist that rates be given a fair and reasonable trial before such rates are considered permanent. The length of the trial period is, on the other hand, a matter of concern to workers in that undue de-

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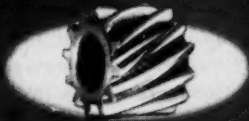
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SHAVING TIME 15 SECONDS



**B**

SHAVING TIME 15 SECONDS



**E**

SHAVING TIME 15 SECONDS



**C**

SHAVING TIME 20 SECONDS



**F**

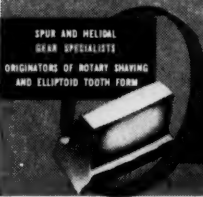
SHAVING TIME 20 SECONDS

## GEAR CHARACTERISTICS

Gear	Stock Removed Over Pins	Material	No. of Teeth	PD	DP	Face Width
<b>A</b>	.010"	Steel	19	2.4"	9.25	5/8"
<b>B</b>	.010"	Steel	29	4.00	9.25	1 1/8"
<b>C</b>	.010"	Cast Iron	28	2 3/4"	10	1 3/8"
<b>D</b>	.005"	Steel	12	1 1/2"	13.5	1"
<b>E</b>	.006"	Steel	14	2 3/4"	6/8	1 1/8"
<b>F</b>	.012"	Aluminum	54	5 3/4"	10	3/4"

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lays between the beginning of an operation and the setting of a rate might result in some loss of incentive earnings.

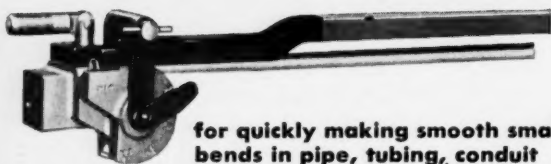
In machine shops operating under an incentive system, certain piece or bonus rates may allow higher daily earnings than rates for other work involving the same operations. Whether wages are computed on a time or incentive basis, there is usually some formal or informal determination of the output expected of employees on each operation. Production standards are commonly determined through time study; i.e., by determining the time normally required to perform an operation in a test run. Time study has been considered a good method for determining standards of production.

Another interesting aspect of collective bargaining provisions for the fore-

man and supervisor of a machine shop is that of apprentices and learners. As you all know, the primary object of apprenticeship is to supply the machine shop with a steady flow of skilled labor through a systematic and supervised course of training - on - the - job. The shortage of skilled workers in machine shops has accentuated interest in systematic training of skilled craftsmen. The problem of apprentice training is not new and has long been an issue of collective bargaining. In the long run, labor and management groups may arrive at identical solutions to these problems; in some instances, their immediate objectives may appear to be conflicting.

Standards of apprentice training are often covered by union agreements which management and unions have negotiated. The Federal Committee on

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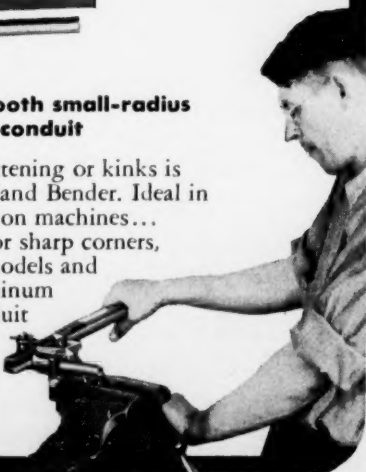


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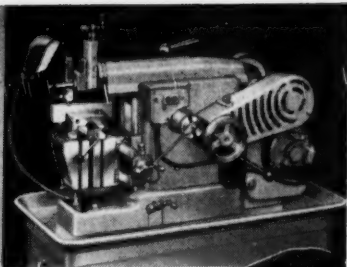


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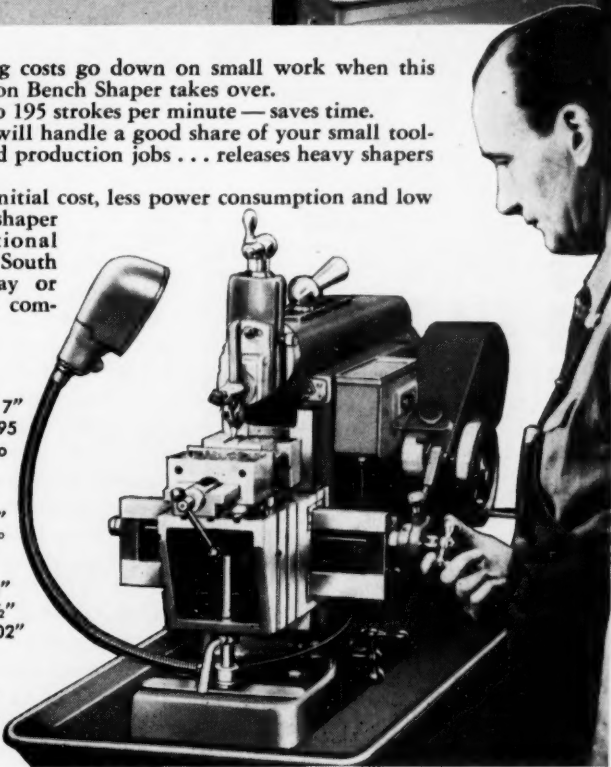
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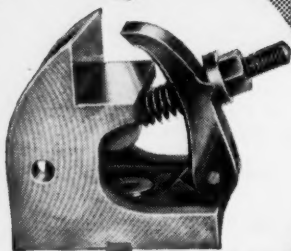
Street \_\_\_\_\_

City & State \_\_\_\_\_

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana



**REDUCE**  
set-up time and the  
need for expensive  
jigs and fixtures

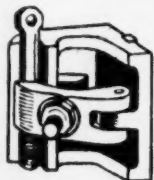


## HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

Many special set-ups can be handled with these inexpensive, versatile fixtures. Hold round, hexagonal, octagonal or square stock, aligning work with machine. Value proved for years in large and small shops.

STAND ON  
END FOR  
STRADDLE  
OR END  
MILLING



4 sizes hold stock from  $\frac{1}{2}$ " to  $4\frac{1}{2}$ ". Any size holds smaller stock with shims.

WRITE FOR NEW  
ILLUSTRATED FOLDER

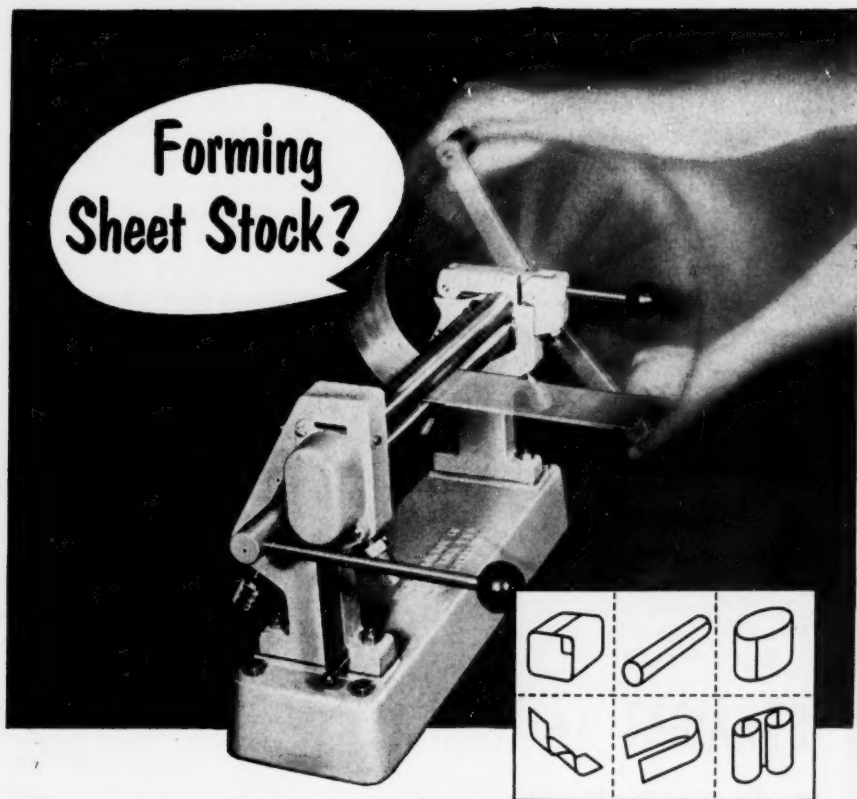
**WALTER W. FIELD & SON, INC.**  
39 Hayward St., Cambridge 42, Mass.

Apprenticeship, the labor-management policy committee for the Apprenticeship Training Service of the U. S. Department of Labor, has recommended standards of apprenticeship, and every foreman or supervisor in the machine shop should obtain a free copy of these standards for informative purposes.

The enjoyment of a vacation with pay has long been the aspiration of American labor. Paid-vacation clauses are now a standard feature of collective bargaining agreements. It will, therefore, pay the foreman or supervisor in a machine shop to become familiar with such provisions, since vacation paid-periods vary. He should know the eligibility requirements; vacation rights of employees leaving the company; vacations for part-time and day workers; computation of vacation pay; vacation schedules; and so on. In addition, the foreman or supervisor in a machine shop should possess a working knowledge of holidays and weekend work, since the question of pay appears to be a major issue. He should learn whether the collective bargaining contract provides for making up holidays; what holidays carry pay; premium rates for work on holidays; and so on.

The foreman or supervisor in a machine shop undoubtedly realizes that the right of an employer to discharge his employees or the right of an employee to quit his employer is seldom questioned in collective bargaining agreements, save discriminatory and unjust actions. The foreman or supervisor who learns about the discharge, discipline, quits, and dismissal pay provisions of a collective bargaining agreement is bound to be a well-informed one. He should know the cause for discharge; have an explanation for

# Forming Sheet Stock?



## Do It Quickly, Easily, Accurately with a New DI-ACRO\* ROLLER

A cam actuated idler roll—an exclusive feature—makes it possible to form any diameter circle in two operations. Also, bends can be located at any point along the edge of a sheet with straight sections on both

sides of the bend. Special rolls are available for forming round, other shaped stock. Eight models. Rated capacity to 16 gauge. Forming widths from 6 to 42 inches.



### SEND FOR 32-PAGE CATALOG

Gives complete details on Di-Acro Rollers, Brakes, and hand and power operated Benders, Notchers, Punch Presses, Rod Parters and Shears.

\*pronounced  
Die-ack-ro



O'NEIL-IRWIN MFG. CO., 306 8th Ave., LAKE CITY, MINN.



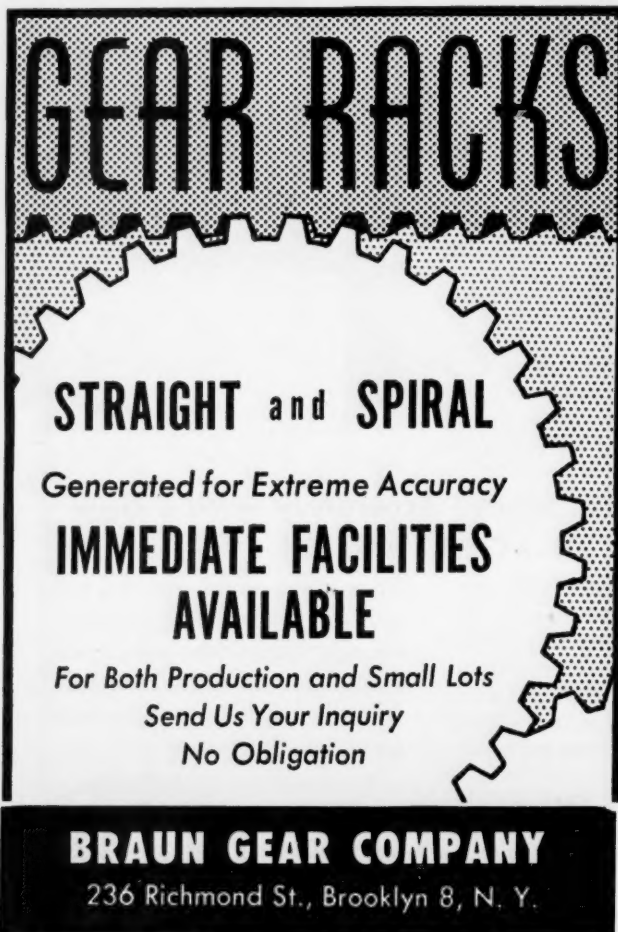
discharge; understand what a protest of discharge is; know the conditions for granting dismissal pay; and understand re-employment provisions.

There can be no doubt that the foreman or supervisor in a machine shop who is acquainted with collective bargaining provisions in regard to wage adjustment plans can materially aid his management in the handling of such matters. He should realize that

wage changes may be based on such factors as cost-of-living, general economic conditions, industry or area wage changes, and so on, since, in general, they affect the machine shop operation as a whole. It would be practical to understand whether the collective bargaining agreement specifies provision for individual wage changes or states the employer's right to reserve in granting increases to workers.

As the foreman or supervisor knows, wage progression plans are designed to reward employees for their increasing skills and abilities or for length of service. He should understand clearly whether machine shop management generally has full discretion in granting or withholding merit increases.

In the interest of efficient machine shop management, every foreman or supervisor ought to know that when a union signs an agreement with an employer pertaining to the terms and conditions of employment, it has a measure of

The advertisement is enclosed in a rectangular frame with a decorative, jagged, gear-like border on the right side. The background of the frame has a halftone dot pattern. At the top, the words "GEAR RACKS" are written in a large, bold, sans-serif font. Below this, the words "STRAIGHT and SPIRAL" are written in a similar bold font, with "and" in a smaller, lowercase font. Underneath, the phrase "Generated for Extreme Accuracy" is written in a smaller, italicized font. This is followed by "IMMEDIATE FACILITIES AVAILABLE" in a large, bold, sans-serif font. Below that, the text "For Both Production and Small Lots" and "Send Us Your Inquiry" are written in a smaller, italicized font, followed by "No Obligation" in a bold, sans-serif font. At the bottom of the frame, the company name "BRAUN GEAR COMPANY" is written in a large, bold, sans-serif font, and the address "236 Richmond St., Brooklyn 8, N. Y." is written in a smaller, sans-serif font below it.

**GEAR RACKS**

**STRAIGHT and SPIRAL**

*Generated for Extreme Accuracy*

**IMMEDIATE FACILITIES AVAILABLE**

*For Both Production and Small Lots*  
*Send Us Your Inquiry*  
**No Obligation**

**BRAUN GEAR COMPANY**

236 Richmond St., Brooklyn 8, N. Y.

# MICROBORE

by DEVLIEG

## FOR PRECISION BORING

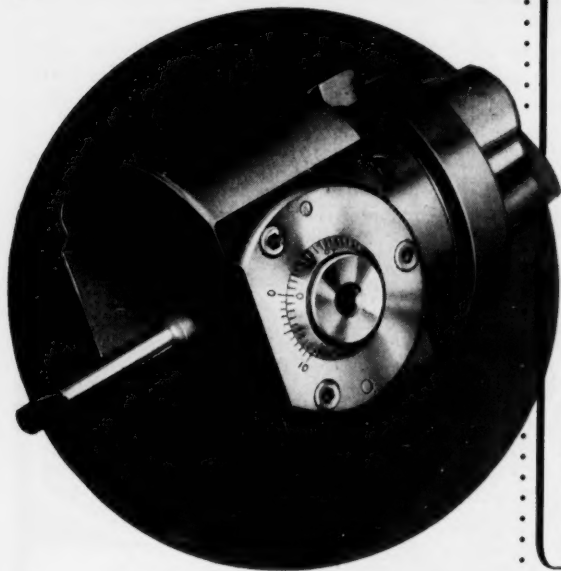
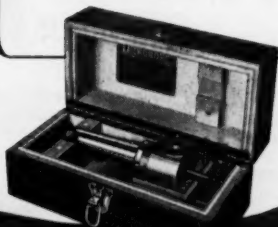


Illustration at right shows boring head with standard set of boring tools mounted in a fitted hardwood case.

### The NEW MICROBORE MB-121 ADJUSTABLE BORING HEAD

This Boring Head is adjusted rapidly and accurately by means of proven Micrometer Vernier principle. The tool slide can be adjusted in accurate increments from zero to  $\frac{1}{4}$ " off center. The boring head can be furnished with straight, taper, or flanged type shanks to suit any make of boring machine. With a standard set of boring tools, bores ranging from  $\frac{1}{4}$ " to 1" diameter can be machined.



# DEVLIEG of DETROIT

DEVLIEG MICROBORE CO.

security, at least for the duration of the contract. Of course, certain rules and procedures governing labor-management relationships would be enumerated therein. The agreement may cover the subject of "closed shop," a highly controversial issue. On the other hand, the foreman or supervisor in a machine shop might well understand that the "union shop" differs from the closed shop in that the employer is free to hire non-union workers and is the sole judge of the qualifications of the applicants.

Perhaps one of the most important things a foreman or supervisor in a machine shop should learn is the adjustment of grievances as cited in the collective bargaining agreement. What is a grievance? Well, a grievance may arise from any number of causes adversely affecting the mental attitude of a machine shop worker toward his

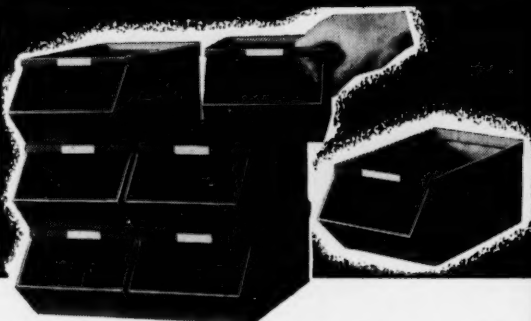
job. The cause may be real or imaginary. Naturally, getting at the underlying conditions which give rise to grievances is essential to good grievance procedure.

There seems to be a sharp difference of opinion over the employee's right to initiate his complaint personally, without union participation, if a collective bargaining contract is in effect. The foreman or supervisor in a machine shop should realize that unions generally prefer to have their representatives handle grievances from the beginning in order to ensure uniform enforcement and equitable administration of the contract. On the other hand, individual employees sometimes feel that they can make a better presentation of their own grievances and prefer to deal directly with their foreman. Many management officials also prefer direct contact between employ-

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Want Them . . .

★ When You  
Want Them



You'll save time, space and labor handling parts and material when you use these patented STACKBINS.® STACKBINS keep parts instantly accessible — eliminate waste hand motions — stock compactly to form units of

exactly the right shape and capacity — make order filling or assembly work faster, easier, more efficient. Heavy steel, all-welded construction. Sizes from 3 1/2" x 6" x 3 1/4" to 15" x 24" x 11".

Manufactured and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa

Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

**STACKBIN**



**SYSTEM**

"Stacked and

Still Accessible"



The New  
Size 00  
with Centering-  
Size Discs

Range  $\frac{1}{4}$ " to  $\frac{3}{8}$ "

Pat. Appl. For



## Dial Bore Gages

8 Sizes cover range  
 $\frac{1}{4}$ " to  $12\frac{1}{8}$ "  
(with extensions to 16")  
Standard, Vertical and  
Pistol-Grip Types



## DuBo Plug Gages

Patented

Tells more, more easily, than  
ordinary plug gages.

Extremely light in weight.

Single End: Sizes over 1.510"  
Double End: Sizes under 1.510"



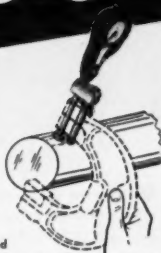
## Dial Indicators

Consistently accurate. Shockproof. A  
wide range of sizes and graduations,  
including Long Range, 90 Degree, Long  
Stem and Decimatic models.

# Your Choice of Many Gages

## Dializers

An economical, effective means for converting  
AGD Adjustable Limit Snap Gages (Models A,  
B or C) to Dial Snap Gages. Easily installed  
or transferred from one frame to another.



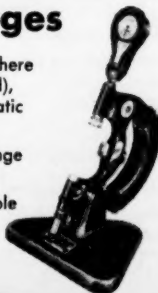
Patented

## Dial Snap Gages

Comparator (shown here  
with optional stand),  
Encased and Decimatic  
Types

Stock sizes cover range  
0" to 8"

Larger sizes available



## Adjustable Limit Snap Gages

AGD designs in both  
regular and midget  
models.



Also . . .  
Master Setting Gages  
Comparators  
Dial Depth Gages  
Dial Pin Gages  
Adjustable Limit  
Length Gages  
and Others . . .  
Write for New Catalog C

**STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.**

ee and foreman and, therefore, the absence of union representatives at the first step.

Some consultants believe that in order to discourage petty complaints, establish the facts, and keep the record straight, it should be a common practice to reduce grievances to writing at some stage in the proceedings. It goes without saying that both sides are bound by the interpretation of a griev-

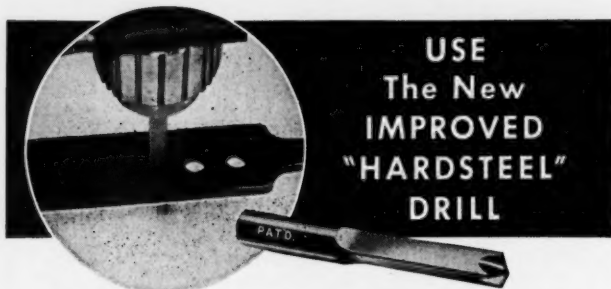
ance contained in their particular contract.

Collective bargaining is a two-way street, and management may at times have just cause for bringing complaints against the union or against an individual employee. It is not enough, however, just to recognize the foregoing collective bargaining factors. A little psychology goes a long way if the foreman or supervisor in a machine

shop understands all such factors. His responsibility to both management and men is widely accepted today. A foreman or supervisor in a machine shop moves on to positions of greater importance when he possesses such invaluable working knowledge of collective bargaining practices, just as he must realize that his company's success depends upon increased production, improved quality, and reduced unit costs.

Finally, the foreman or supervisor in a machine shop should know how to get along with union membership, as well as pursue more training to improve his

## Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—  
With "HARDSTEEL"**

**BLACK DRILL COMPANY, INC.**

1372 East 222nd St. • Cleveland 17, Ohio

Also makers of—  
**BLACK DRILLING  
UNITS—AUTOMATIC,  
SELF-CONTAINED—  
FOR COST-CUTTING  
PRODUCTION ON  
ALL MATERIALS**

Write for information

# NEW...COMPLETE LINE of END MILLS by GO & GO



**Send for Catalog**

NOW you can get off-the-shelf delivery on end mills that GO & GO . . . New styles . . . Additional sizes . . . provide 149 stock end mills to meet ALL your end mill requirements. Long lengths, extra-long lengths, small diameters and 2" dia. shank heavy duty end mills have been added to provide a complete range, as standardized by the Metal Cutting Tool Institute. The famous GO & GO quality is built into these tools. An ideal combination of high helix and curved undercut on the tooth face provides maximum effective shear plus long tool life. Write for new, convenient catalog covering all standard end mills and milling cutters.





Balancing For  
Mass Production  
**"HI-EFF"**  
BALANCING  
MACHINES



**FAST...and ACCURATE!**

- FANS
- IMPELLERS
- GRINDING WHEELS
- TIRES
- BRAKE DRUMS
- SHEAVES
- PULLEYS
- MANY OTHER APPLICATIONS

DYNAMOMETERS • STATIC BALANCERS  
PRECISION DRILLING MACHINES

**TAYLOR DYNAMOMETER  
AND MACHINE COMPANY**

528 W. Highland Ave.  
Dept. 57, Milwaukee, Wis.

own efficiency. On the other hand, the foreman who lacks a working knowledge of collective bargaining practices will stand still. A foreman or supervisor in a machine shop with this knowledge is, indeed, one of the indispensable tools of modern management. He will work harder to feed this inner need of knowledge if he is a leader. And no one can give him this invaluable information except himself.

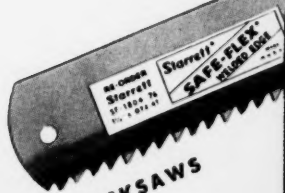
**Mechanical Power Transmission Manual.** By William A. Williams. Published by Conover-Mast Publications, Inc., New York, N. Y. 423 pages. Illustrated. Cloth binding, board covers. Price, \$6.00.

This manual covers briefly, but adequately, the basic fundamentals of acceleration, power, and work governing the selection of proper power transmission equipment. The volume outlines the principles upon which each piece of mechanical power transmission equipment functions, its performance characteristics, its advantages, and the types of drives to which it is best adapted. Various requirements that must be considered in selecting the drive to give the most satisfactory and economical performance are outlined.

The material has been prepared and presented in such a way that the book can be used not only as a reference and a guide, but also as a textbook in mechanical power transmission. The fundamentals contained in the manual are easily understood and followed, and the data pertaining to the various items discussed are right up to date. The merits of the various drives are carefully outlined and fair comparisons drawn.

**SIMPLIFY PURCHASING...**

*Buy* **Starrett**



**HACKSAWS**



**BAND SAWS**



**BAND KNIVES**

### **1 THE COMPLETE LINE**

Hacksaws, band saws and band knives in all types and sizes to meet all requirements . . . all from one dependable source.

### **2 MADE BEST TO CUT BEST**

Precision made to insure correct set for clearance, exact size, uniform temper and maximum cutting ability.

### **3 EASIEST TO BUY**

Stocked and sold by industrial distributors everywhere for prompt, dependable, on-the-spot service.

#### **GUIDES TO LOWER CUTTING COSTS**

Starrett Hacksaw and Band Saw Catalog and Quick Reference Metal Cutting Guide. Write for them. Address Dept. MD.



**Starrett**  
TRADE MARK  
REG. U.S. PAT. OFF.

SINCE 1880  
WORLD'S GREATEST TOOLMAKERS



**THE L. S. STARRETT COMPANY**  
Athol, Massachusetts, U. S. A.

MECHANICAL HAND MEASURING TOOLS AND PRECISION INSTRUMENTS  
DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK  
HACKSAWS, BAND SAWS and BAND KNIVES

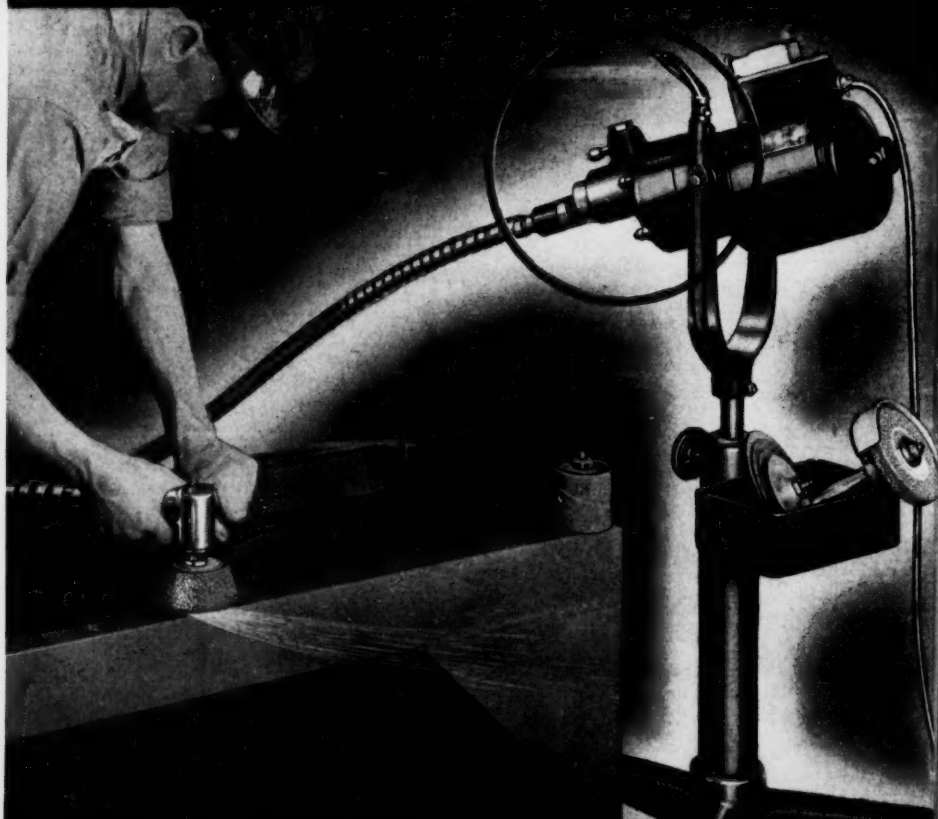
**Buy  
THROUGH YOUR  
INDUSTRIAL  
DISTRIBUTOR**

Prompt delivery  
Dependable service  
Quality products

# **NO PULLEY CHANGES**

## **for multiple-speed**

### **GRINDING • FILING • DRILLING • BRUSHING**



**Strand**  
FLEXIBLE SHAFTS

**the finest in the field**

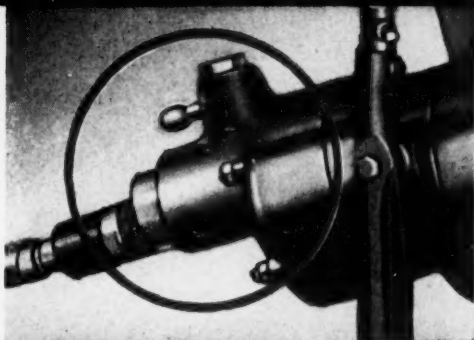
# with the **NEW** *Strandflex*

## **4-SPEED GEAR DRIVE**

### **FLEXIBLE SHAFT MACHINE!**

Think of the time saved over the old-fashioned, knuckle-scraping way of changing V-belts and pulley sheaves! With little more than the flick of a finger the Strandflex 4-Speed Gear Drive Flexible Shaft Machine lets you select any of 4 RPM's. It's the first really new type of Flexible Shaft Machine in over 25 years! And it has been tested and proved in all types of metal cutting and finishing jobs.

Strandflex 4-Speed Gear Drive Flexible Shaft Machines are available in  $\frac{1}{4}$ ,  $\frac{1}{3}$  and  $\frac{1}{2}$  HP and in your choice of two 4-Speed ranges: 850-1800-3600-4500 RPM's or 1700-3600-7200-9000 RPM's. They're built in Bench, Floor or Vertical type units. A complete line of working-head accessories for drilling, grinding, brushing, filing, sanding, buffing and polishing is available . . . all heads are interchangeable on the same shaft. And remember, with *STRAND*, the operator lifts the tool only—not the heavy motor!



**THE PATENTED STRANDFLEX GEAR DRIVE UNIT** itself is enclosed in a housing, thus protected against dirt, grit or foreign matter. Special heavy-duty gear lubrication assures smooth performance under the toughest conditions for long, long years.

See your dealer for a demonstration, or write direct for information. Also ask about the famous Strand line of conventional direct drive and countershaft Flexible Shaft Machines with up to 3 HP motors. Ask for Catalog 331A.



## **FRANKLIN BALMAR CORPORATION**

# Moving and Setting Machinery . . . . .

By IRA S. ROBERTS

*The author describes several effective methods for transporting and installing heavy-type equipment.*

THESE are many different methods for properly handling machines as they are being moved into a plant and installed or removed from the plant floor. The oldtime millwright was a master in the proper use of skids, heavy rollers, pinch bars, and jacks, as well as winches, chainfalls, and other equipment suited to his purpose. His methods are certainly not to be scorned inasmuch as they must still be resorted to in many cases today.

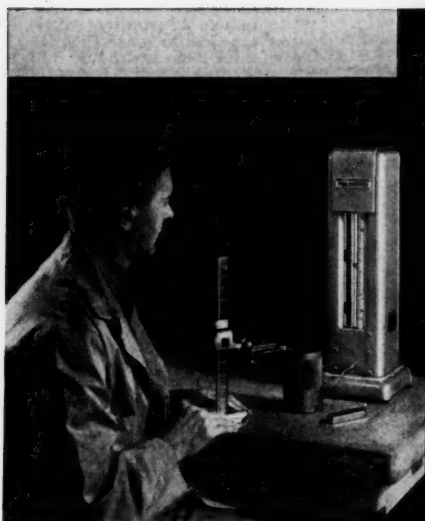
However, many additional aids have been placed at the disposal of men responsible for moving and setting machinery. In many cases, it is entirely possible to slide a skid-mounted machine over a floor by attaching it to a track-type tractor. This method is only practical in cases where there is sufficient room to use a tractor to advantage.

Plants equipped with powerful cranes, and especially bridge cranes, can effectively use such equipment for lifting and transporting machines to their points of installation. Where this procedure is followed, however, particular care must be exercised to assure that no damage is inflicted on the machine in lifting it. There are cases in

which machine elements may be sprung by careless lifting. There are other cases where the use of a sling chain or cable for lifting a machine may be completely out of order. We have in mind the recommendation of one manufacturer of shapers who gives instructions that, if any of his machines are lifted, only a sling of manila rope in good condition (or one of jute rope) is to be employed.

Rope used for smaller shapers may be 1½ inches in diameter. For larger machines, a manila rope not less than 2 inches in diameter should be employed. It is, of course, entirely possible to obtain recommendations from rope manufacturers relative to the heaviest weights that should be lifted with given diameters of their ropes. The particular shapers in mind are designed in such a manner that the rope can be made to bear against the column, both front and rear, so that it will not contact the scraped bearing of the ram.

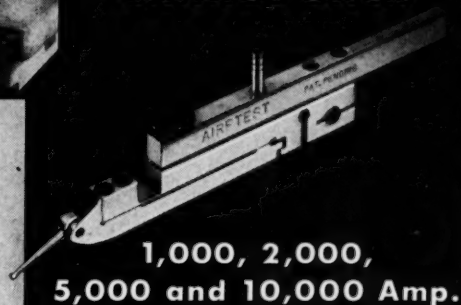
A highly-interesting aspect of machine lifting and moving, wherever there is a reasonably good floor, involves the use of a special truck-like lifting device, which was primarily conceived and designed for lifting and



# Foolproof AIRETEST indicator

**NO HYSTERESIS  
NO LAG or DRAG  
CANNOT STICK**

**REPETITIVE  
READINGS  
POSITIVELY  
ASSURED**



**1,000, 2,000,  
5,000 and 10,000 Amp.**

Repetitive readings at any point are identical whether approach is from front, back or either side with this amazing AIRETEST indicator.



*Ask* **FOR A DEMONSTRATION  
IN YOUR PLANT**

6318

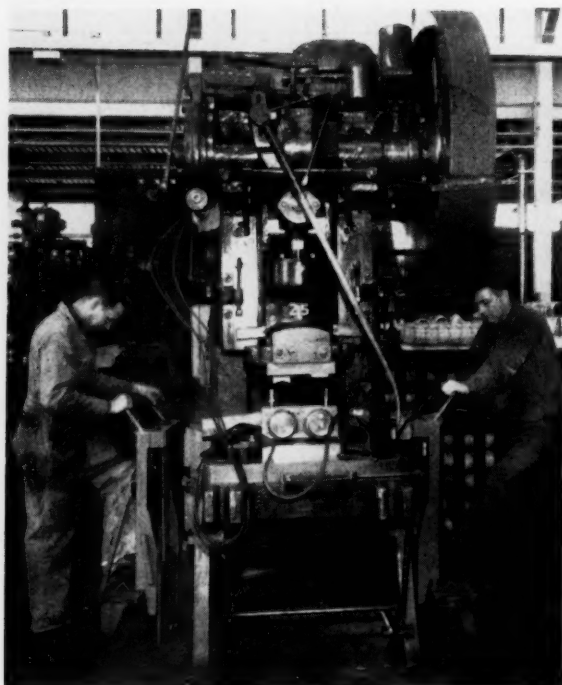
## The **Sheffield** Corporation

DAYTON 1, OHIO, U.S.A.

**GAGES • MEASURING INSTRUMENTS • MACHINE TOOLS  
CONTRACT SERVICES • THREADING TOOLS**

REPRESENTATIVES IN PRINCIPAL COUNTRIES: In Australia, the Sheffield Corp. of Australia Pty., Ltd., Melbourne





In this illustration, workers are shown placing special truck-like hydraulic lifting devices on both sides of a heavy press for subsequently moving the press to a new location in the plant. Illustration courtesy Skarnes Engineering & Supply Co., Incorporated.

and transport a machine so mounted and to readily and gently set it down at any point desired.

Many large and otherwise unwieldy pieces of equipment have been advantageously moved by using more than one pair of such lifts. In one case, fully-assembled spinning frames of great length were readily moved and set by us-

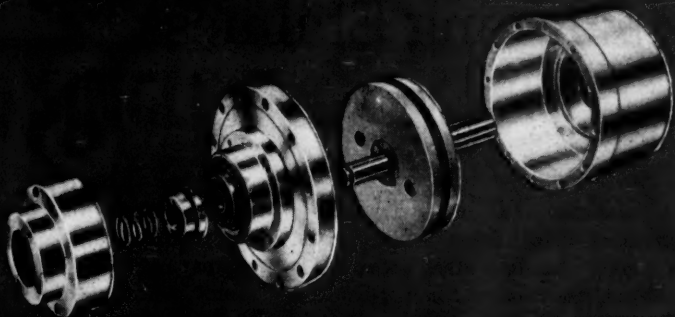
transporting unusually heavy boxes and crates. The device is equipped with a pair of wheels and a pair of hooked-type members. The hook-type elements can be slid under the edge of the object to be lifted. At least two of these devices are used to lift and transport any heavy unit.

The actual lifting action of the device is hydraulically effected. As shown in the accompanying illustration, two of these devices are used oppositely on the load. Their design is such that when the devices are placed flush against the load and the hydraulic lift is employed to lift the load clear of the floor, the effect is that of placing the load squarely on four wheels. Since the wheels or casters are swivel mounted, it is a simple matter to manipulate

ing five pairs of these hydraulic type lifts. Another interesting fact is that one such lift may be used in connection with a power fork truck for handling a load too unwieldy for the truck to handle alone. By lifting one side or end of the load with a lift of this type and the other side or end a like amount with a power truck, one not only makes the load fully mobile but has it attached to a power source that greatly reduces the manual effort involved in its transportation.

**For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.**

# CUSHMAN



## ALUMINUM AND IRON BODY AIR CYLINDERS

### CONSERVE YOUR MAN-POWER



The Cushman Air Chuck Catalog No. PO-64-1952 covers our complete line of Air Chucks, Cylinders, and Accessories.

Cushman Manually Operated Chucks are separately described and listed in Catalog No. 65-1952.

Either or both will be sent on request.



Simple, powerful, and trouble-free in operation, Cushman Rotating Air Cylinders set an entirely new standard for performance. Balanced and with few, rugged moving parts, they operate up to highest required speeds. Cushman engineers have also succeeded in perfecting the air control and power system to the point where applied pressures can be held dependable under production line operating conditions.

Any air chuck is completely dependent upon the efficiency of its operating air cylinder. Cushman Iron Body Rotating Air Cylinders have been designed to safeguard the performance of Cushman Precision Air Chucks, but may be used with other types too. Cushman Aluminum Body Rotating Air Cylinders provide equivalent performance at speeds up to the highest now being used. Low maintenance and long service life are inherent in this simplified design. Consult your distributor or write us direct for further information.

**THE CUSHMAN CHUCK COMPANY**  
818 WINDSOR STREET  
HARTFORD 2, CONNECTICUT, U. S. A.

*Chucking Engineers Since 1862*

Manufacturers of

AIR CHUCKS, CYLINDERS, and ACCESSORY  
EQUIPMENT • THE CUSHMAN POWER  
WRENCH • CUSHMAN MANUALLY OPERATED  
CHUCKS and FACE PLATE JAWS

SC553B

**A WORLD STANDARD FOR PRECISION**

August, 1953

MODERN MACHINE SHOP 175

# Case History No. 7

## Machining Stainless Steel

By G. J. STEVENS\*

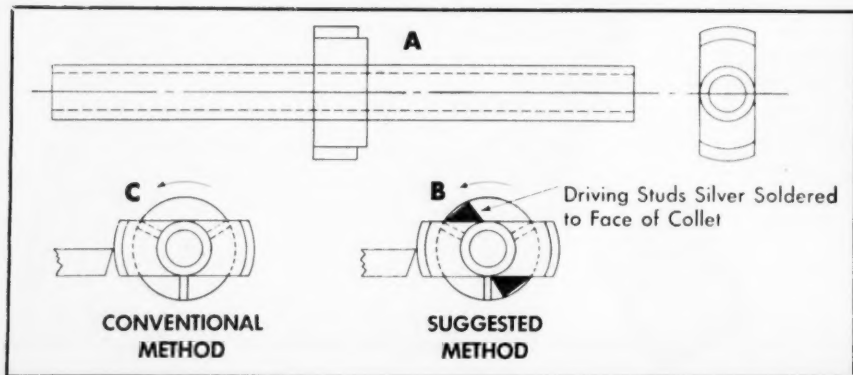
A manufacturer of bottle-filling equipment was having difficulties in machining stainless steel because his small-lot needs would not permit a large production setup. The materials he was using were Types 302, 303, and 416 stainless steel.

One of the jobs was a filling valve requiring an impact cutting operation performed on a 1¼-inch Type 303 round section (A) which was silver soldered to a ½-inch round tube. The machining engineer suggested the use of a special collet equipped with driving studs to prevent slippage and per-

mit heavier tool feeds (B). You can see the difference in application by comparing (B) with (C), the conventional method. For best results, both studs should contact the workpiece. Therefore, care should be exercised when positioning them for silver soldering.

Another part employing a complicated form tool produced a rough finish. It was recommended that the single tool be replaced with two tools mounted on the turret tool post. Two operations would step up machining time per part slightly but would produce better finishes and do away with a subsequent polishing operation.

\*Machining Engineer, Armco Steel Corp.

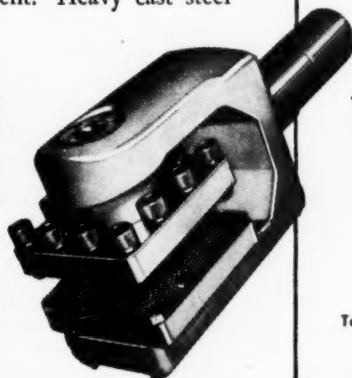


# Perform FOUR operations... from a SINGLE setup

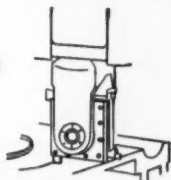
**N**OW, save more setup time than ever before possible! With this new Davis Tool Holder you can turn, undercut, bore and chamfer in one setup. You can mount four tools at once.

One simple wrench adjustment will change your position through  $360^\circ$  in accurately indexed increments of  $45^\circ$ . Two index pins and a center pin locate and clamp the complete assembly in rigid alignment. Heavy cast steel body assures accuracy.

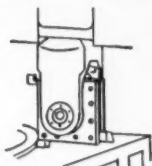
Increase your production with your present equipment . . . solve the age-old problem of too numerous setups, too many tool changes. For details on the Davis 8-Position Tool Holder, see your representative or write direct.



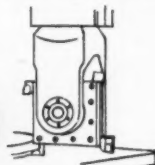
Typical series of operations on a single setup



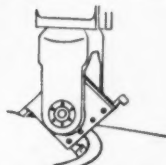
8-Position Tool Holder used in facing operation



Tool indexed  $90^\circ$  for undercutting operation



Tool indexed  $90^\circ$  to present turning tool



Tool indexed  $45^\circ$  for chamfering

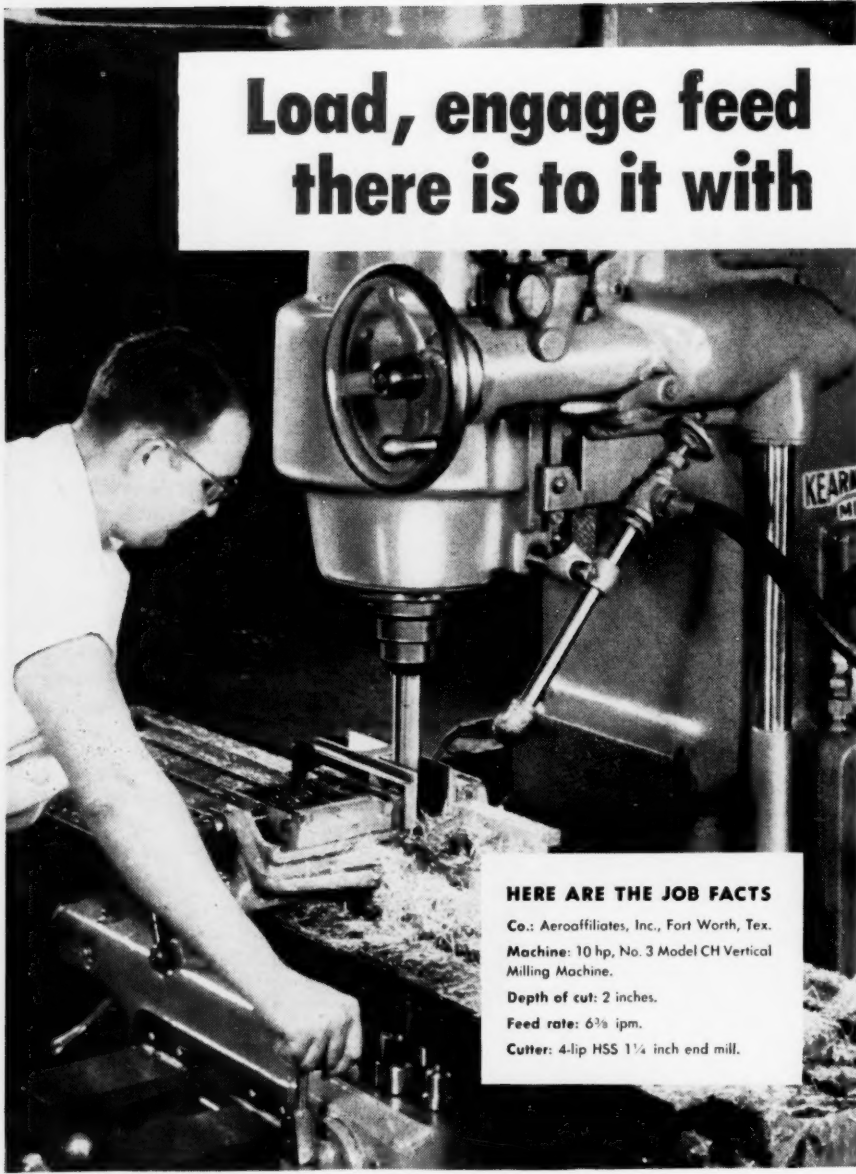
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# Load, engage feed there is to it with

## HERE ARE THE JOB FACTS

**Co.:** Aeroaffiliates, Inc., Fort Worth, Tex.

**Machine:** 10 hp, No. 3 Model CH Vertical Milling Machine.

**Depth of cut:** 2 inches.

**Feed rate:** 63% ipm.

**Cutter:** 4-lip HSS 1 1/4 inch end mill.

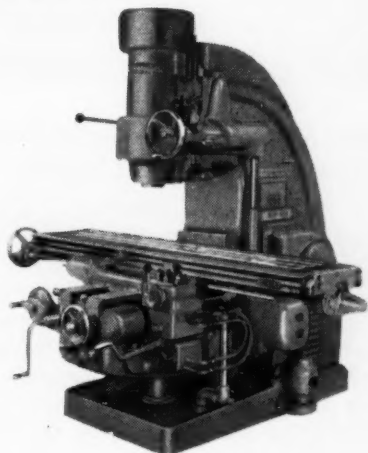
# and unload—that's all this miller!

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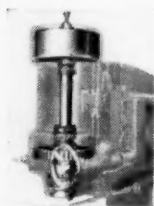


**10 hp, No. 3 Model CH  
Vertical Milling Machine**

**CH Milling Machine features that helped increase output — cut cost per piece**



Greater Operating Convenience through Mono-Lever control facility (optional at extra cost) for table feed and rapid traverse.



Greater Cutting Efficiency through spindle-mounted flywheel, (optional on CH Models) running with three bearing support.



Smoother Feed Performance through large dia. heavy-duty table feed screw that affords greater bearing contact, runs through extra-long table feed nut. All models are equipped with backlash eliminator.





# ideas from readers

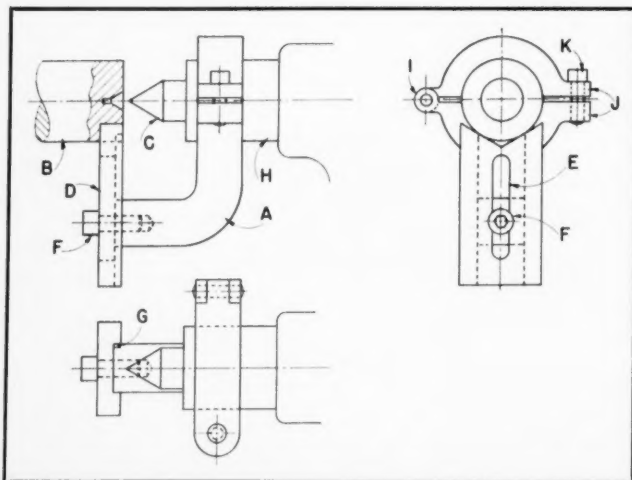
## Mounting Long Workpieces Between Lathe Centers

By F. E. RILEY

**W**ITH the aid of a simple supporting device of the type shown in the accompanying sketch, we have found it an easy matter for a lathe operator to accurately mount bars 5 or 6 feet long between lathe centers. The mounting of such long parts was often a two-man job, one operator holding the work in engagement with

the headstock center while the other operator actuated the tailstock barrel so that the center engaged the center hole in the opposite end of the work. Even short workpieces of only 1-foot length or thereabouts often proved difficult for an operator to mount between centers, and there was always the danger that the center hole in the workpiece might be damaged or that the points of the lathe centers might be chipped.

The principal purpose of the supporting device as shown at **A** in the sketch is to support the tailstock end of the workpiece, **B**, at the correct height for accurate alignment with the center, **C**. The end of the workpiece



Sketch of simple supporting device for accurately mounting long workpieces between lathe centers

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rests in a V-groove machined in one end of a flat piece of steel, **D**, which is arranged for adjusting vertically to allow for the mounting of various sizes of workpieces between centers. The plate has a slot, **E**, milled for the greater part of its length through which is fitted a cap screw, **F**, for the purpose of clamping the V-plate to the body of the support **A**. The portion of the support body on which the V-plate

fits is of square section and is adjustable in a flat-bottomed slot, **G**, machined in one side of the V-plate.

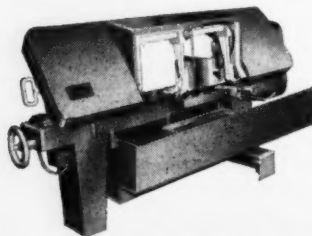
The body of the support **A** consists of a circular ring which is split diametrically so that it can be easily mounted on or removed from the tailstock barrel, **H**, in such a manner as not to interfere with the cutting tools on the machine. The ring has a hinge, **I**, at one side and lugs, **J**, on the other side,

the lower lug being tapped for a cap screw, **K**. Integral with the body of the support **A** is a bent tail on the vertical face, the end of the tail being arranged to slide in the V-plate, **D**. The particular design of support shown in the sketch was machined from the solid and bent after heating to form the tail. Alternate forms of construction are possible by using a flat piece of steel plate and welding a tail thereon.

In use, the support **A** is fitted around the lathe tailstock barrel **H** and locked in position by means of the screw **K**. The V-plate **D** is



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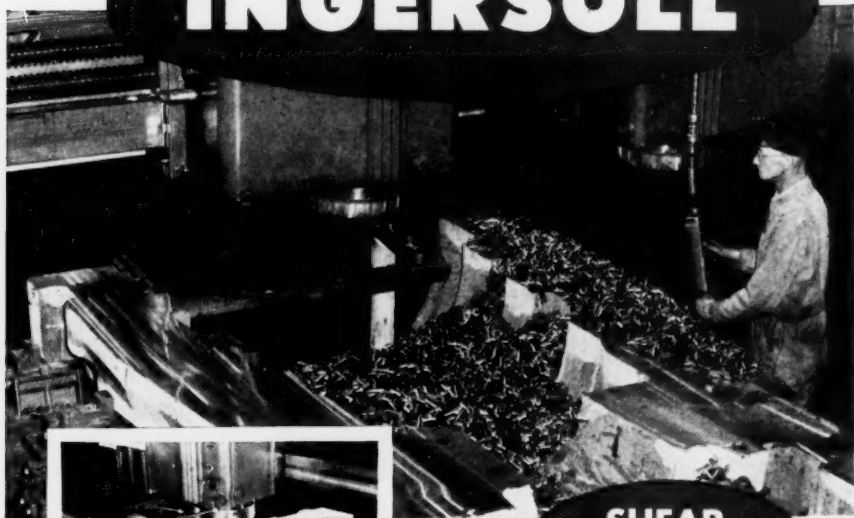


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MACHINE TOOL DIVISION

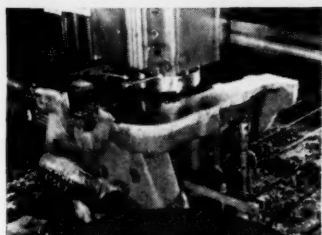
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then adjusted to the proper height and held in place by means of the screw **F**. The workpiece **B** is next positioned in the lathe so that one end rests in the V-groove of the plate **D**. The other end of the workpiece is then pushed into engagement with the headstock center (not shown) and maintained in place by exerting constant axial pressure on the workpiece. The operator is thus able to readily actuate the tailstock handwheel so that the tailstock center engages the hole in the end of the workpiece without the strain of having to support the full weight of the heavy workpiece. After the workpiece has been properly mounted between centers, the support **A** can be removed from the tailstock barrel **H**; however, on many jobs there is no need to remove the support.

## Gaging Fixture for Checking Diameter and Concentricity of Annular Groove

By W. M. HALLIDAY

**T**HE drawings herewith show a gaging fixture for checking the diameter and degree of concentricity of a shallow annular groove machined in the bore of a short sleeve. This sleeve, which is shown at **X** in Fig. 1, is produced in a bar automatic lathe, the bore of the part being machined with a shallow annular groove, **Y**, near one end. The location of this groove relative to the adjacent end face of the sleeve was not critical; however, it was essential that close control be maintained over the diameter of the groove and its concentricity with the main bore of the sleeve. The checking of these critical dimensions entailed some difficulties because of the small

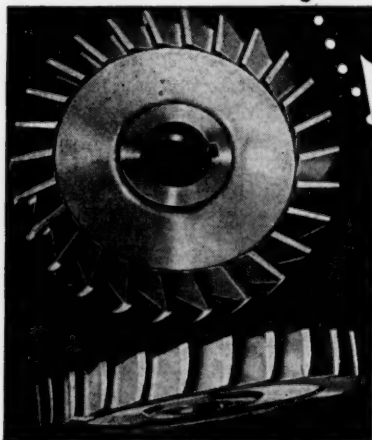
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**A TYPICAL ABER "CURVED TOOTH" PERFORMANCE**  
OPERATION: Milling lugs on plate. Slotting and side milling parallel sides.

MACHINE: Cincinnati 3-Spindle Mill.

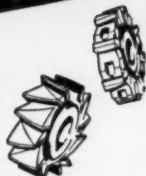
TOOL SETUP: 1. R. H. and L. H. Shear Side Milling Cutter  
1. R. H. Half Side Milling Cutter  
1. L. H. Half Side Milling Cutter

Feed: 10-12"

PERFORMANCE: 16-12 hours between grinds. Best previous practice with conventional, straight tooth H. S. S. milling cutters was 6-12 hours between grinds.

## ABER

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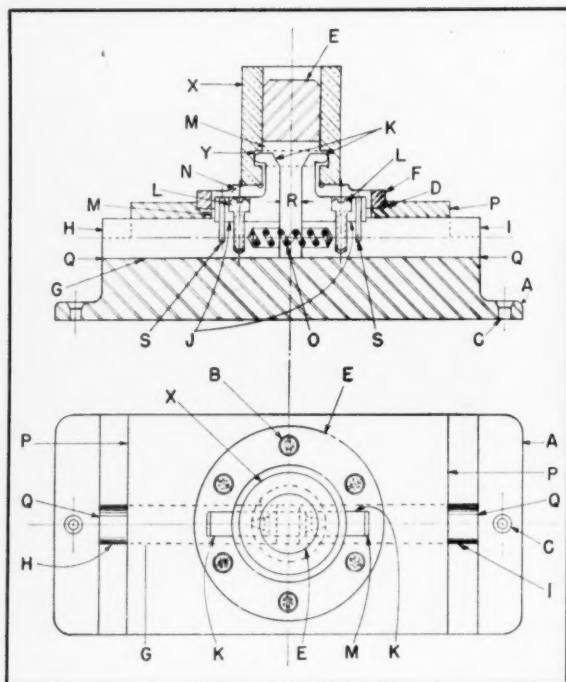


Fig. 1 — Drawing of gaging fixture for checking the diameter and concentricity of annular grooves

tangular steel base plate, **A**, which is provided with two holes, **C**, for fastening to a bench or inspection table. A shallow circular recess, **D**, is machined centrally in the top face of the base plate to accommodate a centralizing plug, **E**, which has a flange, **F**, at one end that is made to provide a tight press fit in the recess **D**. The plug is firmly held to the base plate by means of several screws, **B**. The upper portion of the plug **E** has a close sliding fit in

diameter of the hole which did not allow for the satisfactory application of ordinary pin gages or conventional caliper type measuring instruments.

These difficulties were satisfactorily overcome by employing the special bench type gaging fixture shown in Fig. 1. The fixture consists of a rec-

the bore of the sleeve **X**. A square shoulder face is provided on the flange **F** for the end of the sleeve **X**.

In a hole, **G**, bored through the base plate **A**, identically cylindrical slides, **H** and **I**, are fitted, the slides being ground and lapped to provide a close sliding fit in the hole. For a portion of

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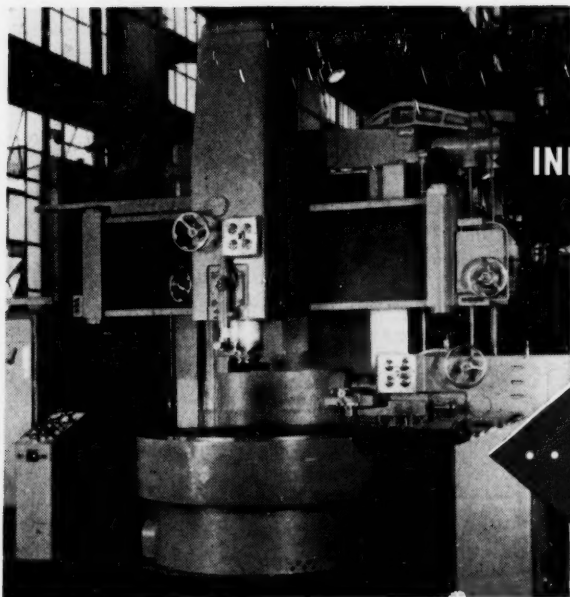
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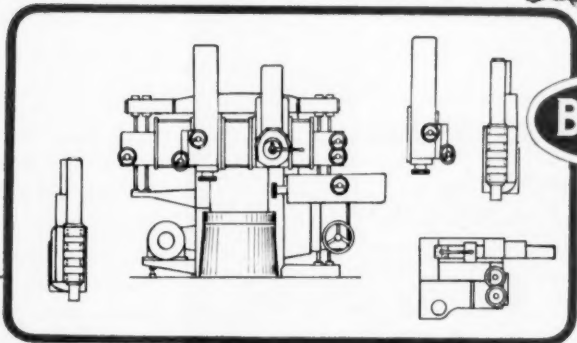
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its length, each slide is machined on one side to form a flat, **J**, to which is permanently attached a specially shaped contact finger, **K**, by means of a screw **L**, and dowel pin **S**. The base portion of each contact finger has a close sliding fit in an elongated slot, **M**, machined in the base plate **A** above the hole **G**. Another elongated slot, **N**, slightly wider than the slot **M** is machined in the lower flanged end of the plug **E**. This slot extends into the shank

of the plug **E** to a point slightly above the top of the groove **Y** when the sleeve **X** is resting on the top of flange **F**.

One end of slides **H** and **I** is drilled for a short depth to accommodate a light compression spring, **O**, the purpose of which is to force the two slides apart and spread the contact fingers **K** as far as possible in the groove **Y** of the sleeve **X**. The length of the slot **M** in the base plate **A** determines the distance which the fingers can be forced

apart. The distance, **R**, between the contact fingers **K** in the proper gaging position, as shown in Fig. 1, should be approximately three times the depth of the groove so as to obtain the necessary closing movement for each finger to allow the part to be removed by complete withdrawal of the toe portions of fingers **K** from groove **Y**.

To place a sleeve in the proper position on the plug **E** for gaging, the slides **H** and **I** are moved inward to retract the toe portions of contact fingers **K**. This is done by merely placing the thumb

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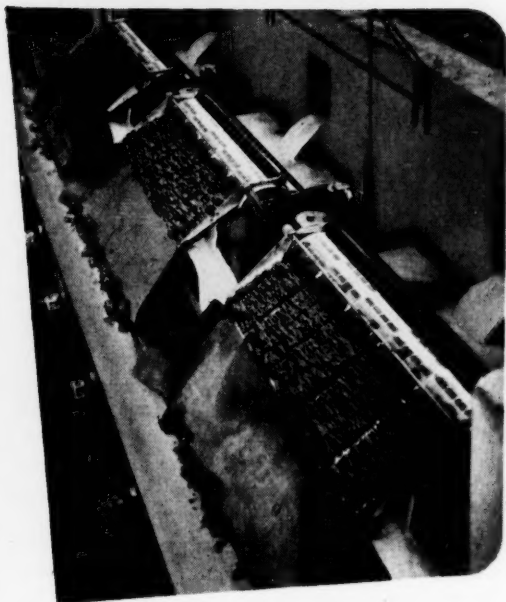
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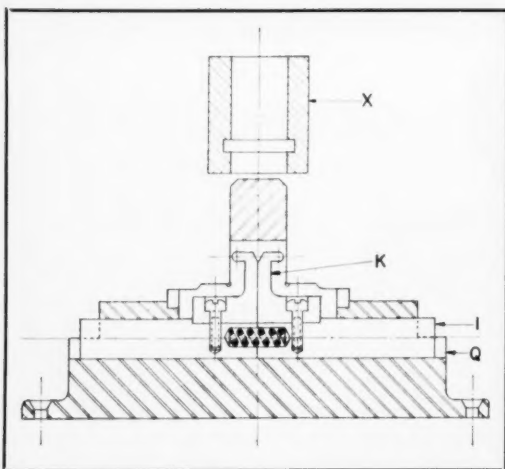
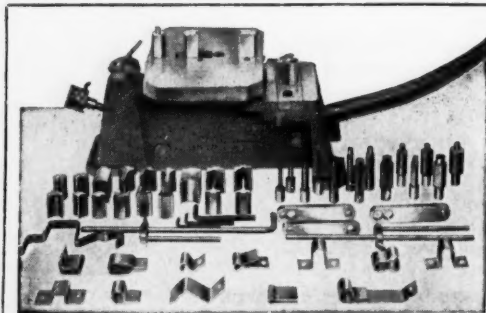


Fig. 2—Drawing showing manner in which sleeve is inserted on gaging fixture for checking diameter and concentricity of annular groove

on the end of slide **H** and a finger on the end of slide **I** and lightly compressing the slides (Steps **P** on the sides of base plate **A** allow access for thumb and forefinger to the slides) against the pressure of spring **O**. Holding the two slides in the closed position, a sleeve may be slipped on the plug **E** in a manner as shown in Fig. 2. When the sleeve has been properly located on the plug **E**, finger pressure on the slides **H** and **I** is released, thus allowing the toe portion of each contact finger to be forced into the annu-

lar groove **Y** and to bear against the bottom surface thereof. If the groove is the correct diameter, the outer end of each slide will be exactly even with the square edge **Q** on the side of the base plate **A**. Slide locations can be easily checked by merely feeling with the tip of the finger. Half the amount of tolerance permissible in the groove diameter is machined as a small step on a portion of each edge **Q** to still assist the operator in determining the magnitude of any error present in the groove diameter. The degree of concentricity of the groove may be checked by moving the sleeve radially into three positions about 120 degrees apart. If the groove is truly concentric with the bore, the ends of slides **H** and **I** will occupy the same positions relative to edges **Q** at all three positions checked. Errors will be indicated by an extension of one slide beyond face **Q**.



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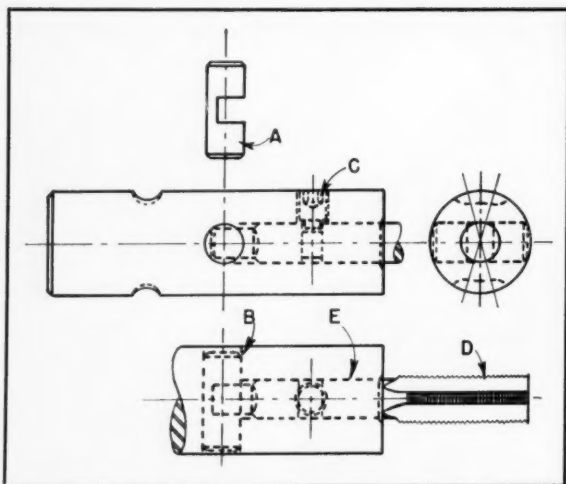


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Drawing of easily-made tap holder that provides floating tap action

the hole **E**, thus allowing a floating action which eliminates a large percentage of tap breakage.

## End Mill Used with Router

By GILBERT C. CLOSE

**B**Y adapting a special end mill cutter and holding fixture for

use in an Onsrud router, shop employees at Northrop Aircraft, Inc., Hawthorne, Calif., have speeded up the tedious operation of finish-machining routed angle legs. This work was formerly accomplished by hand filing. With the fixture shown in the accompanying illustration, the operation has been speeded up 1,000 per cent.

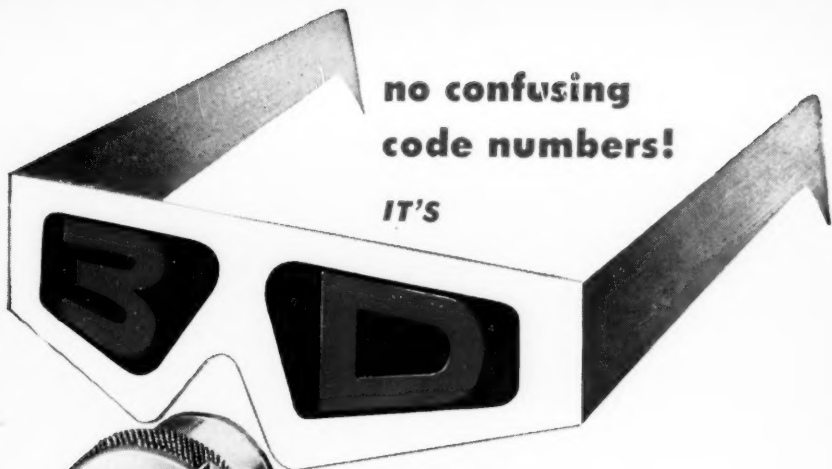
## Easily-Made Holder Minimizes Tap Breakage

By RICHARD JOHNSON

**I**N the accompanying drawing, the writer presents a design of tap holder which can be quickly and economically made for rush salvage or production jobs on drill presses or screw machines. The holder includes a round slotted driving pin, **A**, having a slip fit in a hole drilled through the holder at **B**. This pin can be quickly and inexpensively replaced if broken. A set screw, **C**, on the side of the holder permits the tap, **D**, to be held loosely in



Northrop Aircraft worker uses router equipped with special end mill and holding fixture for finish-machining routed angle leg.



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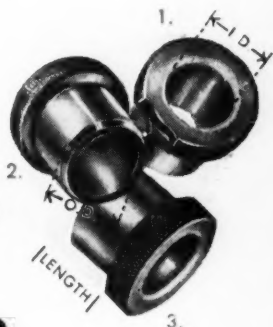
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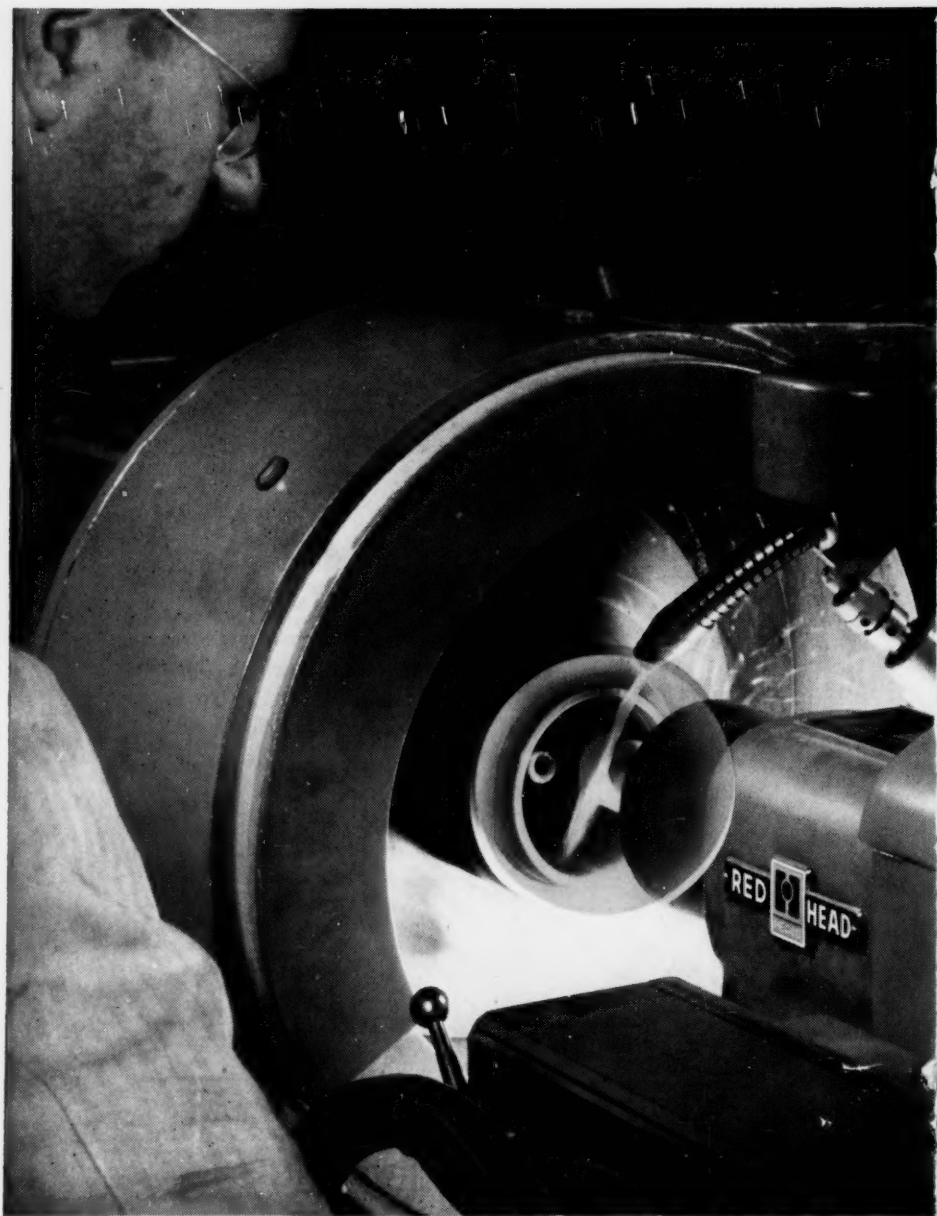
**AMERICAN DRILL BUSHING CO.**

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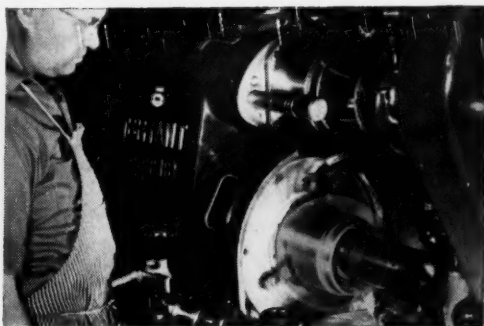
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### **Norton G BOND wheels are precision-processed for identical precision-performance**

Built by Norton's exclusive *precision-processing*, the new Norton G Bond wheels for internal grinding are completely uniform in structure. Just pull off a worn out wheel and slip on a new one — and you'll get exactly the same grinding action every time. Eliminating the fussing with the timing cycle, they save you time and money on every job.

Added to this, the new Norton G Bond, designed for precision and semi-precision grinding, is one of the greatest advancements in vitrified bonds ever made. Holding each abrasive grain for maximum cutting action, it assures a constant grinding surface of fresh, sharp cutting edges. As a result, G Bond wheels cut cooler . . . remove material faster . . . produce a better finish . . . produce more pieces per dressing . . . hold their shape better.

**THOROUGHLY JOB-PROVED.** Typical reports from internal grinding customers after switching to G Bond wheels: *Total pieces per wheel jumped from 200 to 400 . . . Twice as many roller bearing races ground per dressing . . . Grinding cycle reduced from 7/10 minute to 4/10 minute . . . Pieces per dressing increased from 9 to 15.*

**SEE YOUR NORTON DISTRIBUTOR** for further facts on this value-adding, profit-boosting "Touch of Gold" for your internal grinding. He'll gladly arrange a test in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities — see your telephone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

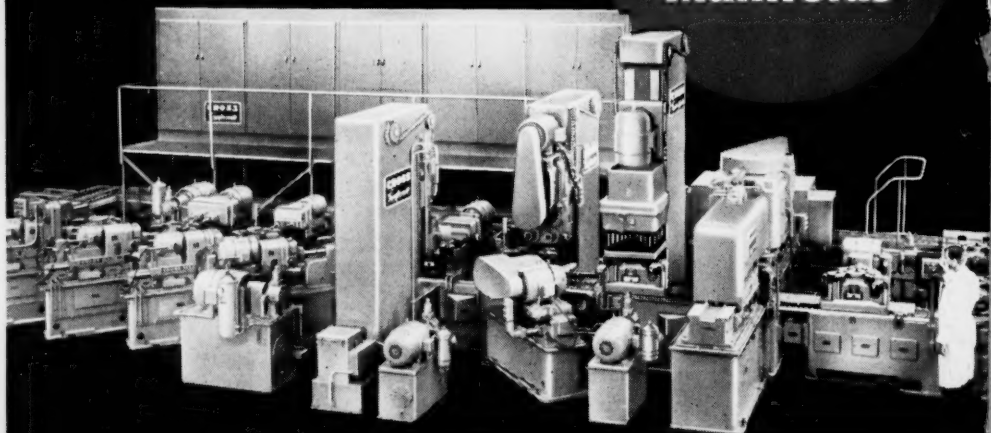
W-1506



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Manifolds**



- \* Machines right and left exhaust manifolds completely — 42 milling, drilling, boring, chamfering, and tapping operations.
- \* 230 pieces (115 right and 115 left) per hour at 100% efficiency.
- \* Ten stations—one loading, one unloading, three milling, three drilling, one boring, one tapping.
- \* Palletized work holding fixtures with power wrenches for automatic operation.
- \* Cross-Drive for milling cutters.
- \* Other features: Built-in chip conveyor and automatic removal of chips from fixtures after each cycle, pre-set tools, J.I.C. standard construction, automatic lubrication, hardened and ground ways.

Established 1898

THE **CROSS** CO.  
DETROIT 7, MICHIGAN  
*Special* MACHINE TOOLS

## Important Meeting Dates

### September 21-25

Eighth National Instrument Exhibit sponsored by the Instrument Society of America, Sherman Hotel, Chicago, Illinois.

### September 23-26

National Association of Foremen Annual Convention, Milwaukee, Wisconsin.

### September 28-30

National Electronics Conference, Hotel Sherman, Chicago, Illinois.

### October 5-7

American Society of Mechanical Engineers Fall Meeting, Sheraton Hotel, Rochester, New York.

### October 19-23

National Metal Exposition, Cleveland Public Auditorium, Cleveland, Ohio. Sponsored by American Society for Metals, American Welding Society, Metals Institute Division of the American Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing.

### October 19-23

Forty-first National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and Hamilton hotels, Chicago, Illinois.

### October 25-28

American Gear Manufacturers Association Semi-Annual Meeting, Edgewater Beach Hotel, Chicago, Illinois.



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**CHICOPEE, MASS.**



## modern equipment at work

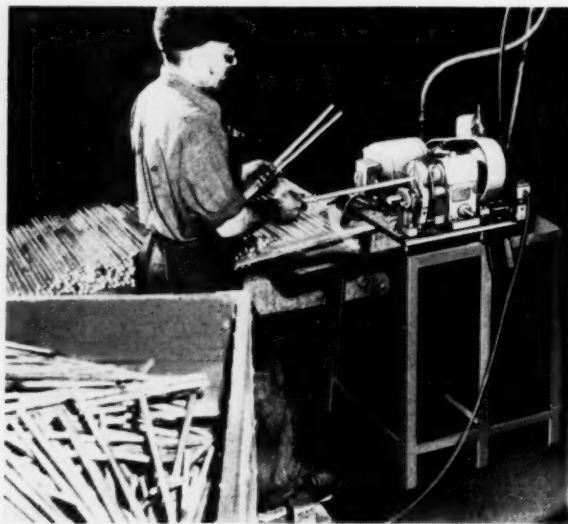
### Bench-Type End-Finishing Machine Speeds Rod- Pointing Operations

**I**N a large farm equipment plant, a wide range of steel rod-pointing work is currently being handled 40 per cent faster than by previous methods on a new bench-type end-finishing machine. On the job illustrated, previously handled on a threading lathe,

direct labor costs per 100 pieces have been reduced from 51 cents to 23 cents. The piece is a  $\frac{5}{8}$ -inch diameter C-1010 steel rod.

The machine, built by Pines Engineering Co., Inc., Aurora, Ill., is equipped with a foot-controlled air cylinder. The operator depresses an electrical foot control which starts an automatic clamp and feed cycle. The work is fed to rotating cutters which are held in

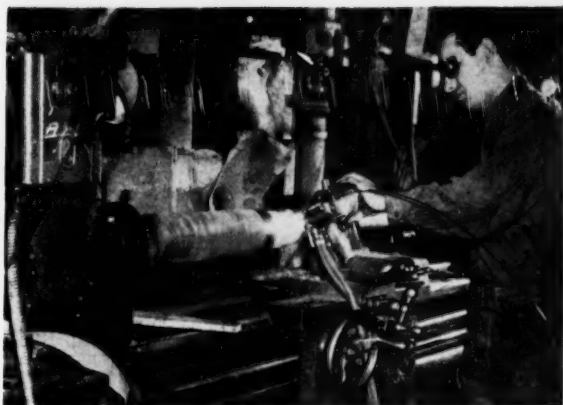
the main spindle behind the chuck jaws. When the pointing operation is completed, the chuck automatically returns the workpiece and unclamps. The operator's hands are free at all times for faster stock handling and loading. Multiple cutters reduce



Pines end-finishing machine being used for rod-pointing work on farm machinery parts. Unit is equipped with foot-controlled air-operating cylinder. Work is clamped, fed to tools, and unclamped automatically.

Metallizing Carryall axle in  
Sprabond Wire salvage job

time required for the machining cycle. In addition, an automatic swing-type stock stop permits fast positioning of the work in the open chuck jaws. An adjustable stop screw controls the forward travel and depth-of-cut.



## Mismachined Axles Reclaimed by Metallizing

**A** LEADING manufacturer of heavy road building equipment uses metallizing for the salvage of parts accidentally mismachined in its production shop. Most of this work is done on the bearing and seal-fit portions of front-stub axles used in the company's earth moving equipment. These axles, varying in size and shape, are valued, after manufacture, at between \$75.00 and \$130.00.

A typical application of metallizing involved the salvage of stub axles—each made of 5-inch bar stock and 30 inches long—which were accidentally

machined undersize at one of the bearing fits. The part was set up in a lathe, cleaned with emery cloth, and then sprayed with Sprabond Wire for about 10 minutes to bring the undersized area to the required dimension, with allowance for finishing. A number of these axles have been in service for 18 months, withstanding the toughest kind of service. According to company officials, there has not been a single report of equipment trouble due to the metallized parts. As a matter of fact, the Engineering Department of this large manufacturer has indicated that the hard, oil-bearing, metallized surface should provide a longer service life than an unmetallized part.

ON OILY AND  
GREASY FLOORS

**STOP**

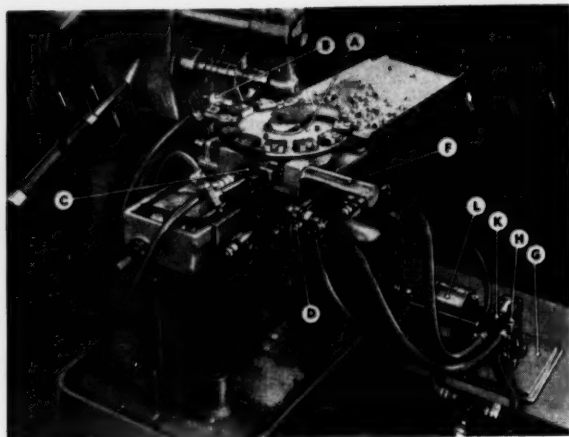
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**FULLER'S EARTH**

Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.  
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DEPT. RM-9

TAMMS INDUSTRIES, INC., 228 N. LA SALLE ST., CHICAGO 1, ILL.



This illustration shows how, through the use of various air-operated devices, a hand milling machine has been converted into a semi-automatic machine for the production slotting of threaded brass valve plugs.

## Air Power Converts Hand Miller into Semi-Automatic Machine

**T**HE accompanying illustration shows a Mead rotary work feeder mounted on the moving table of a Nichols hand milling machine. The table is moved forward and backward by a 1½-inch double-acting air cylinder with a 5-inch stroke. This setup, however, presented a problem as to how to synchronize the motions so that the dial of the rotary work feeder would not rotate while the work was passing under the cutter.

To solve this problem, the following

sequence was finally adopted: (1) a 4-b master (not shown) opens the main air line; (2) a master valve supplies air through three branching hose lines to an FC-2 limit valve (F) which is normally "on," the auxiliary valve (C) of the rotary work feeder (A), and the No. 2 valve (K) of the timer (G); (3) air passes through the FC-2 valve (F) to the work feeder (A), which indexes; (4) when the rotary work feeder is in locked position, air passes through the auxiliary valve (C) and (5) the auxiliary valve (C) admits air to the H-1 midget work-holding cylinder (B) and to the No. 1 valve (H) of the timer (G); (6) air passes through the valve (H) into the timer cylinder (L) and into the feed cylinder (D); (7) the time valve (H) closes, the valve (K) opens and supplies air to the front end of the feed

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Surface Plates, Angles, Parallels, and Straight Edges are all backed by over forty years of practical experience. You pay no more for this added assurance of accuracy and durability.

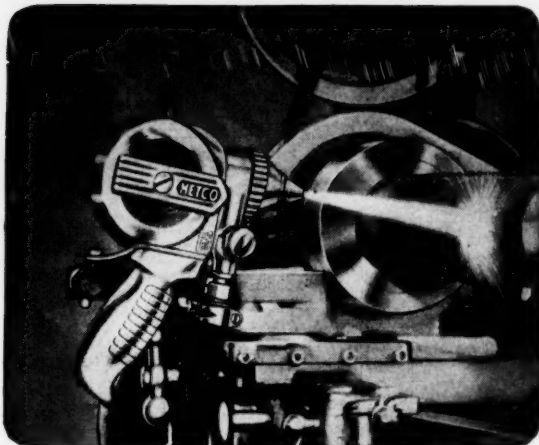
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Engineers and Machinists Since 1907

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Milwaukee 4, Wis.





**now  
a really  
low-cost  
metallizing  
installation...  
with the new  
Metco L-Gun**



Metallizing damaged journals on turbine shaft



Building up worn brake-drum



Metallizing protective coating on steel plate

New, low, compressed-air requirements... only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor... bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- ▶ Save up to 90% of replacement costs on machine repair jobs,
- ▶ Do your own hard-facing,
- ▶ Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

**Sprays 23 Different Metallizing Wires**—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless, babbitts, brass, bronze, nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

**It's Versatile**—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.\*

**Same High Quality as Other Metco Guns**—The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

**A Real Opportunity for the Smaller Shop**—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

**Free Bulletin or Shop Demonstration**—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Me.  
The following names are the property of Metallizing Engineering Co., Inc.  
METCO® • Sprabond wire • Metco-Weld

REG. U. S. PAT. OFF.

**METALLIZING ENGINEERING CO., INC.**

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☐ Please send me more information about metallizing.  
☐ Please arrange a demonstration in my shop.

Name \_\_\_\_\_  
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cylinder (D), which retracts to starting position; (8) when the cutter is clear of the work, the cam which is mounted on the moving table of the mill closes the valve (F), allowing the rotary work feeder to exhaust and pick up another station, and, as the cam rides past, it reopens the air line to the work feeder and starts the cycle over again.

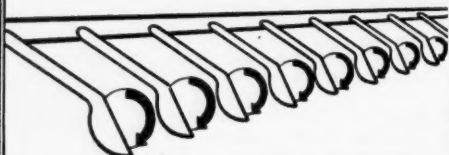
It will be noted that both the rotary work feeder and the work-holding cylinder (B) remain locked while the table moves forward and backward; however, when the table returns to its starting point, the rotary work feeder and work-holding cylinder are momentarily released so as to index to the next station. The workpieces are loaded by hand at the two nests near the front and are ejected from the nests by a cam at the opposite side.

The workpieces consist of threaded brass valve plugs, each of which require a slot to be milled in the end. With the setup shown, production has been increased from an average of about 375 pieces per hour to more than 1,200 pieces per hour. The air-operated devices used in the setup were supplied by Mead Specialties Co., Dept. NM-42, 4114 N. Knox Ave., Chicago 4, Illinois.

### Jeweler's Lathes Aid Manufacture of Guided Missiles

IT is not generally known that the production of guided missiles involves the making of small parts to extremely small tolerances. At Bell Aircraft Corporation, one of only four companies holding prime contracts for

## STOP DUST With DUSTKOP

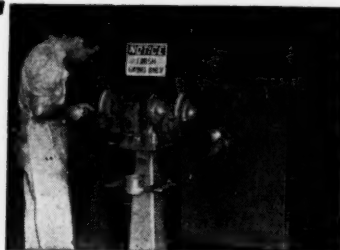


Low cost, immediate control of dust from one remote dust source, or from a whole shop!

**AGET-DETROIT CO.**

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Ann Arbor, Mich.



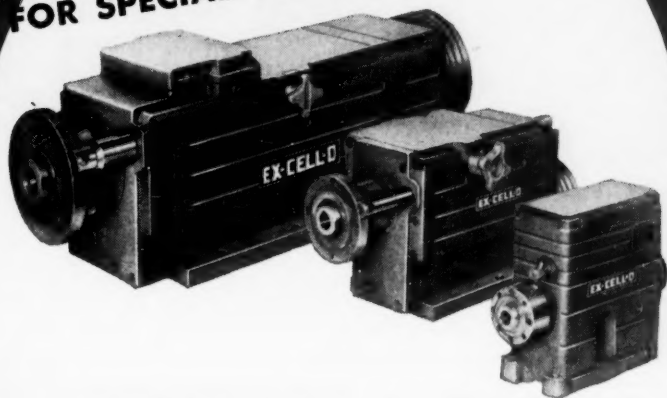
300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock.

Ask for catalog  
605-2

No obligation.

# EX-CELL-O Hydraulic Power Units

## FOR SPECIAL PURPOSE MACHINES



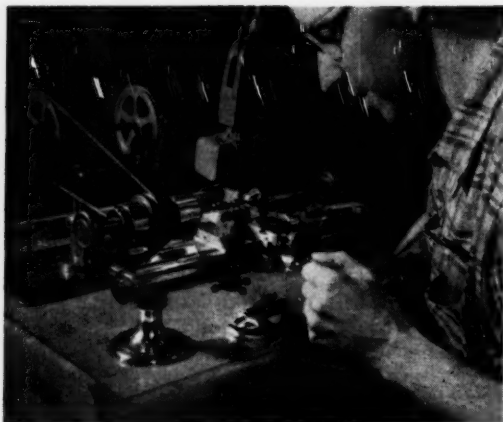
Ex-Cell-O Quill Type Hydraulic Power Units provide a compact, flexible source of power for feeding, rotating and retracting cutting tools. They are especially suitable for automatic drilling, reaming and counterboring, using a single tool held directly in the spindle, or using two or more tools in a multiple head. Three standard units are available—styles 28-A, 21 and 20, shown above. For full information send for Bulletin 45828.



**EX-CELL-O CORPORATION**

DETROIT 32, MICHIGAN





Jeweler's lathe used to machine servomechanism valve for guided missile

both missile airframe and power plant, tolerances of from 0.0001 to 0.0002 inch are specified by the design engineers.

Jeweler's lathes, manufactured by

machining operation being performed on a servomechanism valve for a guided missile. Extreme accuracy is important if the "bird" is to perform its mission satisfactorily.

## COMET

### BORING, FACING, and INTERNAL THREADING TOOLS

For holes from 3/32" upward, 15 different sizes

**Made of Super-High-Speed Steel  
Specially Heat Treated  
and Carbide Tipped**

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.

**Comet Tool Co.**

738 Broadway  
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*Because your Blanchard Grinder deserves the best*

## USE BLANCHARD GRINDING WHEELS

25 years of experience in building both grinders and wheels puts Blanchard in a unique position to give you the best results in surface grinding. There is a *correct* Blanchard Wheel for your work, whether it is as tough as copper or fragile as glass — whether it involves long or short runs — whether it demands heavy stock removal or finishes to 1 microinch — whether it requires clean-up cuts or flatness to .000005"! Top economy and production result only when you use the correct wheel for each individual job. Your nearest Blanchard representative will be glad to put his experience to work for you.



**THE BLANCHARD MACHINE CO., 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.**

*Also investigate* **THE BLANCHARD CYLINDER WHEEL HOLDER!**

This new device eliminates sulphuring and thus reduces down-time. It's a real time, money and trouble saver. Grinder head is merely lowered onto wheel — clamps quickly secure the wheel — you're ready to grind! Available for 10", 11", 16", 18" and 20" Blanchard Wheels.



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Please send free copy of Blanchard Wheel Booklet and Wheel Holder Folder.

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## Conveyor Moving of Heavy Material by Hydraulics

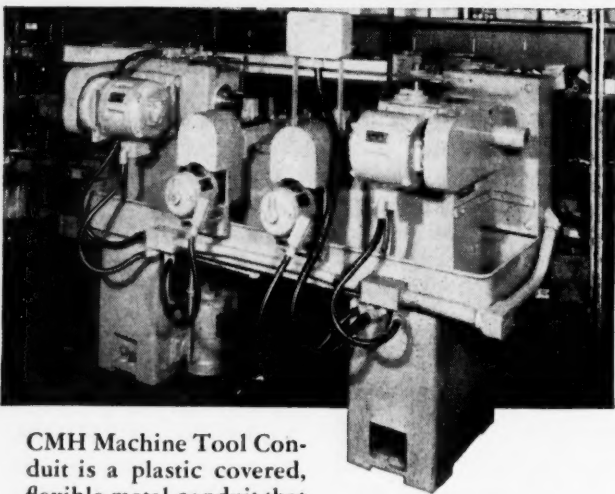
**A** coil handling equipment conveyor at the U. S. Steel Sheet & Tin Mill in Gary, Indiana, is illustrative of the growing role that fluid power is playing in the movement of heavy materials efficiently and economically. Large, heavy coils of sheet steel are pushed, tilted, lifted, and pulled down a con-

veyor line by means of seven special long-stroke Lindberg air and hydraulic cylinders for final positioning on three gravity conveyors leading to the entry end of the pickle lines. Coils range from 30 inches in diameter x 2 feet high to 4 feet 6 inches in diameter x 6 feet 2 inches high and weigh up to 25,000 lb.

Referring to the accompanying illustration, cranes lift the coils from the storage area in the raw coil pick-

ling department and position them upright on a powered conveyor leading to a turntable. Due to the varying sizes of the coils, an operator turns the table until the coil fits snugly against the pusher head of a mill type air cylinder (A) with a 16-inch bore x 72-inch stroke. This cylinder pushes the coil onto a powered conveyor that carries it to a point where a 2,000 p.s.i. hydraulic cylinder (B) with an 11-inch bore x 84-inch stroke operates in conjunction with a special tilting mechanism to tilt the coil on its side. The coil now at rest on a

## CMH MACHINE TOOL CONDUIT protects vital wiring



CMH Machine Tool Conduit is a plastic covered, flexible metal conduit that protects electrical wiring from on-the-job moisture and liquids. It is crush-resistant and absorbs machine motion without losing its moisture tightness. Sizes from  $\frac{3}{8}$ " to 2" I.D. Write for bulletin.

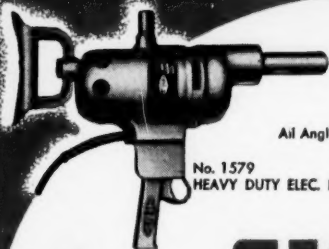


### CHICAGO METAL HOSE DIV. FLEXONICS CORPORATION

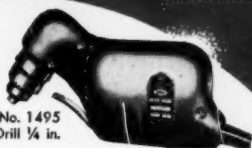
1373 S. Third Avenue, Maywood, Illinois

Manufacturers of flexible metal hose and conduit, expansion joints, metallic bellows and assemblies of these components.

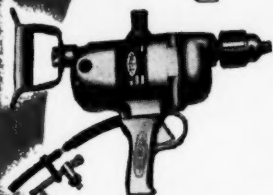
In Canada: Flexonics Corporation  
of Canada, Ltd., Brampton, Ontario



No. 1579  
HEAVY DUTY ELEC. DRILL 1 in.



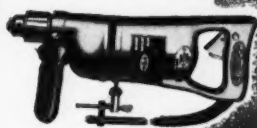
No. 1495  
All Angle Elec. Drill 1/4 in.



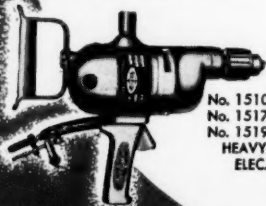
Nos. 1550-1560-1575  
1/2 in., 3/4 in., 3/8 in.  
HEAVY DUTY ELEC. DRILL



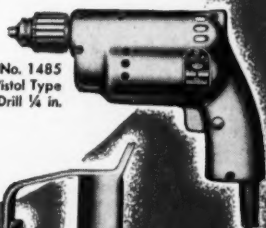
Nos. 1525-1480 1/4 in.  
HEAVY DUTY ELEC. DRILL



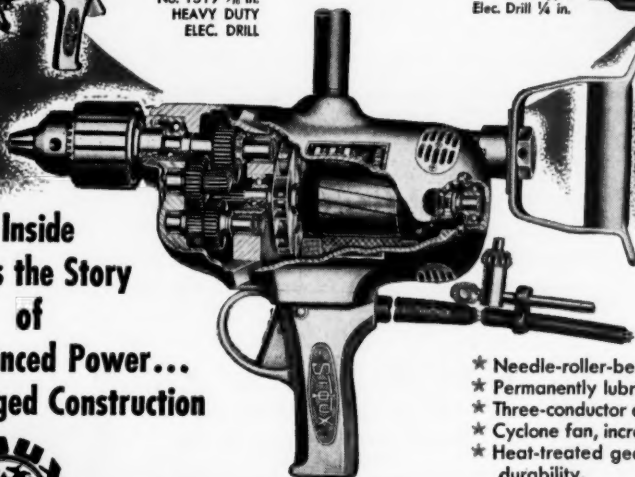
Nos. 1548, 1/2 in.—1541, 3/8 in.  
ELEC. DRILL



No. 1510 1/2 in.  
No. 1517 3/4 in.  
No. 1519 1/2 in.  
HEAVY DUTY  
ELEC. DRILL



No. 1485  
Pistol Type  
Elec. Drill 1/4 in.



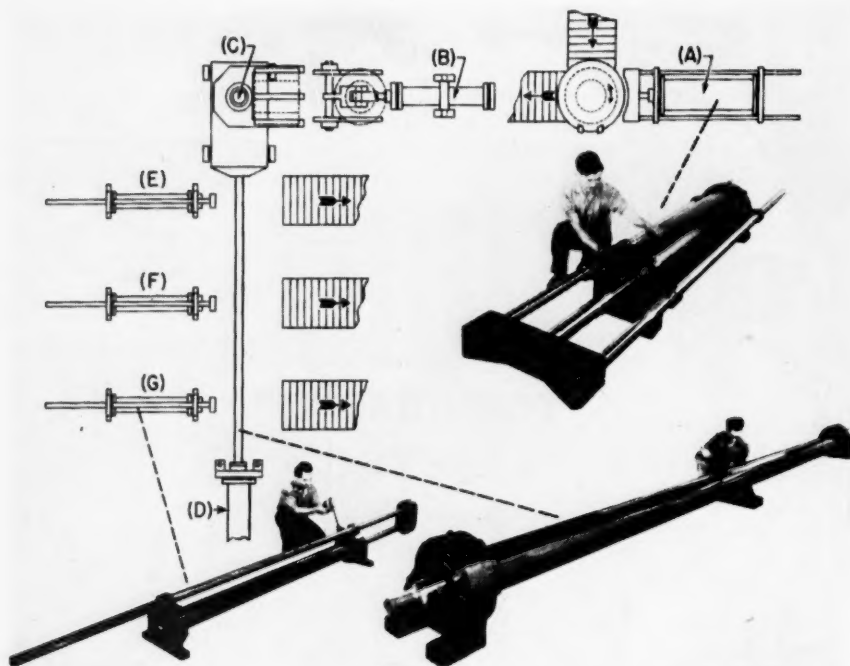
The Inside  
Tells the Story  
of  
Balanced Power...  
Rugged Construction

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- ★ Permanently lubricated.
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- ★ Heat-treated gears to increase durability.
- ★ Durable aluminum metallic finish.
- ★ Momentary safety switch.
- ★ Oil packed and sealed.
- ★ Ball bearings.



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SIoux CITY, IOWA, U.S.A.



Schematic diagram showing how Lindberg air and hydraulic cylinders are used at U. S. Steel Sheet & Tin Mill to move large, heavy coils of sheet steel down a conveyor line for final positioning on three gravity conveyors leading to entry end of pickle lines

dolly at the end of this conveyor is lifted a few inches by a pendulum-mounting mill type 2,000 p.s.i. hydraulic cylinder (C). The dolly is pulled down to one of three gravity conveyors feeding the entry end of the pickle lines

by a 2,000 p.s.i. hydraulic cylinder (D) with 8-inch bore x 288-inch stroke. Three foot-mounted 2,000 p.s.i. cylinders (E, F, and G) with 5-inch bores x 96-inch strokes push the coil off the dolly onto the desired gravity conveyor.



## GAMMONS WELDERS' SEATING REAMERS

for replaceable Welding Tips  
Duplex Design • End Cutting  
Stocked in 4 Sizes

GIVES PERFECT SEAT FOR NEW TIPS

Manufacturers of helical taper pins,  
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Check hole sizes and locations, find centers,

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Oil-hardened tool steel tapered pin gages accurate to  $+0.0001'' - 0.0000''$  insure dependable sizing and location of holes and slots for machinists, set-up men, tool and die men, inspectors, all who need precise hole measurement.

CONCENTRIC TAPER on lower half of each gage fits holes  $0.0012''$  smaller

than standard letter, fraction, and number size drill holes. Makes insertion easier. Permits gaging of odd-size holes and slots.

ALL GAGES are  $1\frac{1}{2}$  inches long. Sets contain a pair of each size in a plastic case with 4-place decimal equivalents of each size plainly marked.

ALL ITEMS STOCKED FOR IMMEDIATE DELIVERY

THE <i>Horberg</i> GAGE COMPANY	
Quantity	23 STAPLES ST., BRIDGEPORT, CONN.
Letter sets @ \$45.	Please Rush checked items and literature to
52 gages (A-Z)	
Fraction Sets @ \$50.	company.....
60 gages ( $\frac{3}{16}''$ to $\frac{1}{2}''$ in $\frac{1}{64}''$ steps)	address.....
Number Sets @ \$90.	name.....
120 gages (1 to 60)	title.....
Single gages @ \$ 1.	
Stand alone @ \$10.	



## High Speed Welding of Non-Ferrous Tubing

**T**HE Yoder Co., Cleveland, Ohio, has been perfecting the process and the equipment necessary for continuous high speed cold forming and welding of non-ferrous tubing in completely integrated tube mills. The induction welding of non-ferrous tubing by the new process is done at speeds ranging

from 40 f.p.m. up to 120 f.p.m., depending on the kind of metal, gauge, and diameter of tube. The induction welding is performed by high-frequency current introduced through a short inductor coil, through which the cold-formed tube passes without contact. The current travels around the surface of the tube in the region of the inductor and then flows along the converging edges of the (unwelded) tube, to and

from a nearby point of convergence, which is substantially beyond the field of induction and close to the center line of a set of rolls which presses the seam edges together. As the current approaches the point of convergence of the edges, it is, due to the skin effect as well as the proximity effect, confined to a very shallow layer on the surfaces of the two abutting edges.

Physical tests made on samples of Types 304 stainless steel show that the tensile strength of the metal in the weld zone is about 15 per cent higher than that of the strip from

**NEARLY TWO MILLION NOW IN USE**

**FOSTORIA  
LOCALITES**

for Machine Tools, Assembly  
and Inspection Benches

Industry's best  
tool for fast,  
accurate,  
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**\$6.12  
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in package of 6  
Single Units \$7.65 Each

### MODEL 3267-H-174

Overall length 32 3/4". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

- **Rugged Construction** withstands vibration and rough handling
- **Instantly Adjustable** with flexible ball and socket joints
- **Reflector** accommodates 100 watt or any A-19 or A-21 medium screw base lamp
- **Baked Enamel Finish**— Exterior, smooth Gray — Reflector Interior, high temperature White
- **Wired Complete** with switch socket and 8-ft. oil-resistant cord and moulded plug

Write for complete catalog of Localite models with various type reflectors, arms and bases for every industrial use.

**THE FOSTORIA PRESSED  
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FOSTORIA, OHIO**

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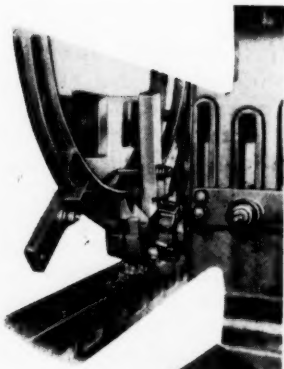


Reg. U. S. Pat. Off.

**OK Carbide Cutters mill vital  
"Thunderjet" forgings—41**

As reported previously, Liberty Products Corporation, Farmingdale, L.I., produces the forged-steel bulkhead for Republic Aviation's F-84 "Thunderjet." This vital assembly provides the connection point for the wing spars, and hence every milling operation must be . . . properly performed—yet at minimum cost.

**"properly  
performed  
... at minimum cost!"**



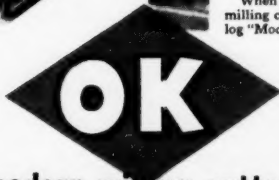
SECOND OPERATION on these tough, heat-treated forgings involves milling the spar-connection bosses to proper thickness. To do this, the piece is clamped to a box-section fixture set up on a Kearney & Trecker No. D-11 duplex milling machine. The two bosses are milled with a 7-in. dia OK face mill having negative axial and radial rakes and fitted with carbide-tipped blades. Spindle speed is 200 rpm.; table feed 5.3 in. per min. This figures out to a cutting speed of 360 surface ft. per min., and a chip load of 0.0022 in. per tooth.

It is important that these bosses be smoothly milled to a thickness tolerance of 0.005 in. (actually 0.004 in. is easily maintained). Production amounts to three pieces per hour, both sides of two bosses being milled. Nine pieces are obtained per cutter grind.

Economical milling is realized throughout the Liberty Products plant by standardizing on OK cutters. Basic reasons for this choice are: OK cutters are *designed and made* so that each tooth takes its share of the load, resulting in smooth finishes and high metal-removal rates. The wedge-shaped blades require no locking devices. They can't pull out or twist to spoil the cut, but they can be removed quickly for replacement. By making blades interchangeable in several sizes of a specific type of cutter body, economy in stocking of blades is promoted.

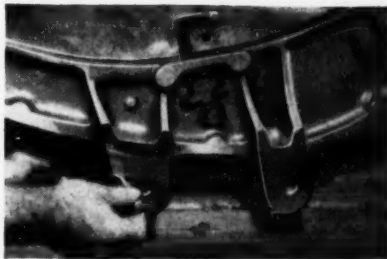
You may not be machining aircraft forgings to exacting specifications, but OK cutters will serve you just as efficiently regardless of material. We offer tools designed for negative or positive rakes, and supply high-speed steel, cast-alloy or cemented carbide blades.

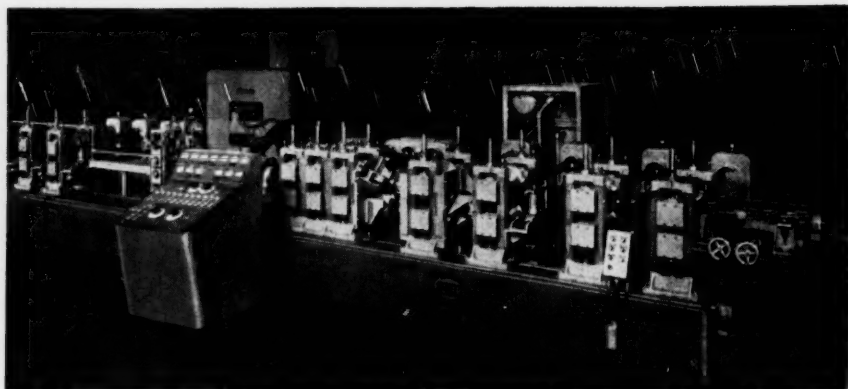
When you get our complete story, you will see the logic of standardization on OK milling cutters, counterbores, facing heads, hollow mills, and reamers. Write for Catalog "Modern Milling Cutters for Modern Milling Machines."



**modern milling cutters  
for  
modern milling machines**

**THE OK TOOL COMPANY, INC., MILFORD, N. H.  
Division Williams and Hussey Machine Company, Inc.**





This illustration shows a mill built by Yoder for the Bridgeport Brass Co., Bridgeport, Conn. It is designed to operate at speeds from 40 to 120 f.p.m., the speed depending on gauge and kind of metal to be welded. The capacity ranges from  $\frac{3}{4}$  to 4-inch tubing, in gauges from 0.025 up to 0.134 inch.

which the tubes were made. Similar results have been obtained in tests on other non-ferrous metals, showing consistent weld strength as and higher than that of the coiled strip from which the tubing is made.

Welds in tubes made from different grades of aluminum, nickel, and other metals show uniformly narrow weld zones with a grain structure almost unaffected by the heat. The weldable metals include almost the entire range of aluminum alloys available in coiled sheet form; certain magnesium alloys; a wide range of brasses and other copper alloys; nickel and nickel alloys,

such as Monel and Inconel; also austenitic and ferritic stainless steels and the lighter gauges of carbon steels.

Besides making tubing for conventional structural, decorative, and fluid-conveying purposes, it also became evident that the new process is ideally adapted for making aluminum cable sheathing, a product rapidly being adopted for many types of telephone, power, and bridge cable. With high speed it combines the advantage of continuous forming around cable of any desired length. In addition, the cable can be fed into the mill simultaneously with the strip, the latter

## LUERS

### PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

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***Plate that's shaped to save you money***

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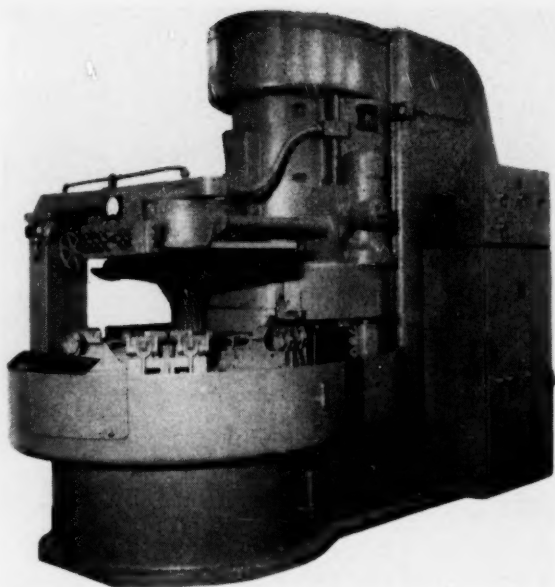
A DIVISION OF LUKENS STEEL COMPANY



**LUKENS**

Fig. 1—Besly 36-inch vertical grinder used by farm equipment manufacturer in grinding replaceable plow shares

being formed around it and welded, without injury to any covering of paper or rubber. In passing through the sizing mill, the sheathing is rolled down or "sized" to fit tightly around the cable. The process eliminates the separate operation otherwise necessary of pulling the cable through the finished sheathing.



### High Speed Grinding of Plow Shares

**H**IGH production rates have been achieved by one farm equipment manufacturer in grinding replaceable plow shares through the use of a Besly No. 953 36-inch vertical grinder, as illustrated in Fig. 1. A maximum of  $\frac{1}{4}$  inch of stock is removed from each share at a rate of between 350 and 400

steel shares per hour by the grinder.

Adapted for automatic operation, the grinder, which is powered by a 100 h.p. motor, is equipped with five automatic clamping fixtures which can accommodate 12, 14, 16, and 18-inch plow shares. The fixtures are mounted on a rotary table which automatically revolves beneath the abrasive disc of the grinder, as shown in Fig. 2. As a further automatic feature, the grinder is



#### Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for  $\frac{1}{4}$ " to  $2\frac{1}{2}$ " balls.

#### FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range  $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

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**LONGER TIME BETWEEN SHARPENINGS**

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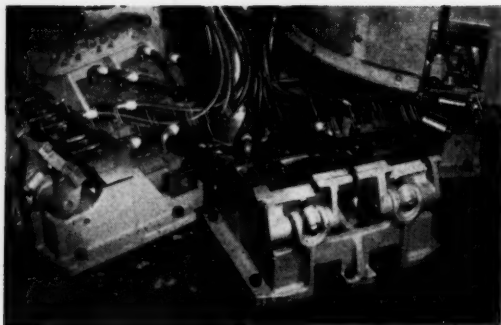


Fig. 2 — Close-up view of rotary table of grinder showing automatic clamping fixtures mounted thereon for holding blow shares during grinding

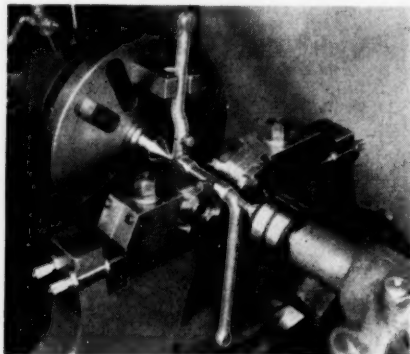
equipped with a mechanism to compensate for abrasive wear. This adjustment can also be made manually. Duties of the single operator are limited to loading and unloading the fixtures.

### Live Center Permits High Speed Threading of Bicycle Crankshafts

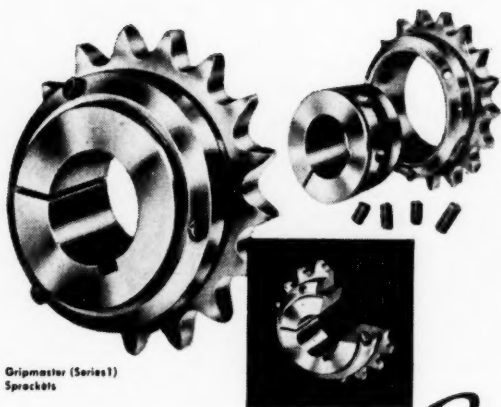
**B**ETTER than three bicycle crankshafts per minute are threaded on a James Coulter Model AL-2 automatic turning and threading lathe equipped with a Red-E Anti-Friction Center. With the previously used center, the "boss," which is very frail, was subject to early breakage due to the friction caused by metal turning against metal. With the live center turning with the work, friction is eliminated and the piece held firmly without play or wobble. As a result, the operator spends less time in maintenance and is able to obtain greater production out of the machine. In addition, rejects are

### Engraving Machine Cuts Precision Drafting Templates

**A** new technique for transferring repeated elements for drafting which remain constant from job to job has been announced by New Hermes Engraving Machine Corp., 13-19 University Pl., New York 3, N. Y. Architects and engineers who are constantly faced with the problem of reproducing standard elements such as switch assemblies, pump units, valves, and so on, which must be duplicated for plans covering projects of similar nature, may now eliminate the costly and time-consuming process of redrawing each



Setup showing use of live center in automatic turning and threading lathe for threading bicycle crankshafts

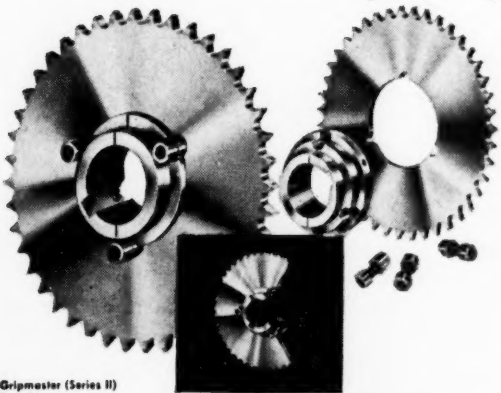


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# CULLMAN *Gripmaster* S P R O C K E T S



Gripmaster (Series II)  
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- ▶ Reduced inventory requirements
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- ▶ Positive shaft fits
- ▶ Simplified speed changes
- ▶ Minimum service requirements

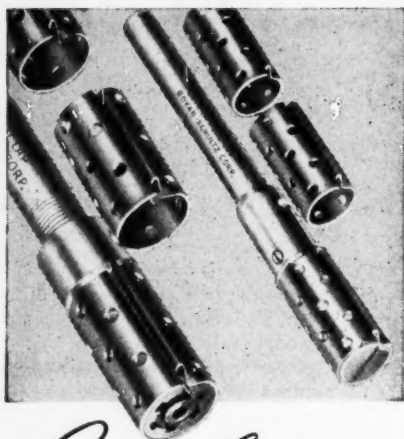
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... are accurate, fast working and easy to use. They are much less costly than making laps in your own tool room. Because the only wearing part is the inexpensive copper sleeve they are long lasting.

Unlike laps made for specific jobs, they are used over and over again, changing only the sleeves. Adjustment permits correct lapping size to be maintained till sleeve is worn out and replaced with a new one. Thus, with Boyar-Schultz Copper Head Laps you save tool room time and get accurate, speedy lapping.

Copper Head Laps and Sleeves are immediately available from stock, in standard sizes— $1\frac{1}{8}$ " to  $2\frac{1}{2}$ " diameters.

### SPECIAL TOOL MAKERS BENCH LAP SET

Consists of seven most commonly used sizes— $\frac{1}{8}$ ",  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{3}{8}$ ",  $\frac{7}{16}$ ",  $\frac{1}{2}$ ", with enameled die cast base.



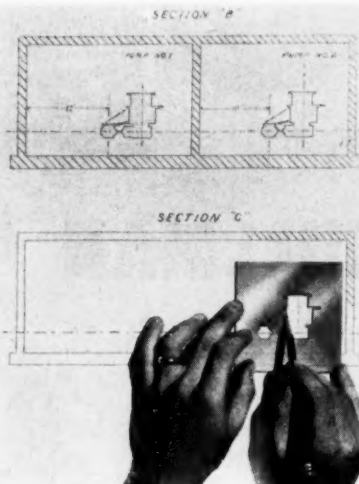
### BOYAR-SCHULTZ CORPORATION

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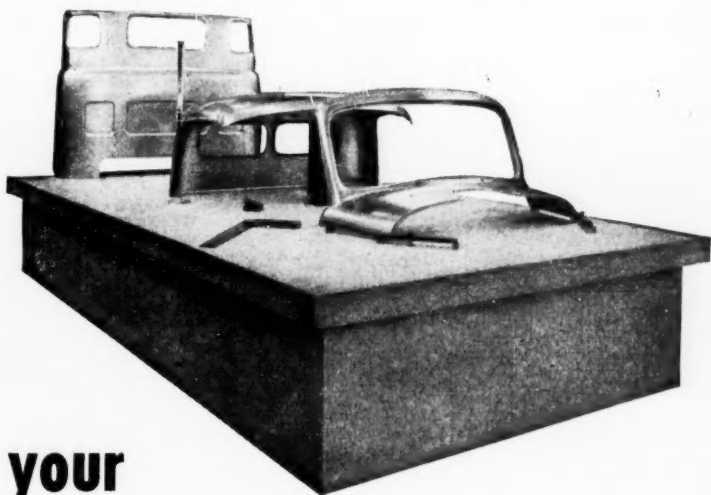
time an element which appears in an assembly. Instead, the draftsman utilizes the New Hermes Engravograph to cut precision templates of the units to be repeated.

With the Engravograph, the draftsman creates templates to suit his individual needs with speed and economy. A master design may be quickly pre-



This illustration shows how a precision template, made on a New Hermes Engravograph, is used to transfer repeated elements for drafting.

pared, from which the Engravograph reproduces the template by means of a rotating engraving cutter guided by a pantograph duplicating the original on a sheet of transparent plastic. The engraving cutter can be shaped so that the image produced has beveled edges conforming to the angle of the point of the pencil necessary to produce accurate lines. For firms not wishing to cut their own master templates, New Hermes will furnish the templates from drawings or sketches submitted.



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**is always a Granite Surface  
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REGARDLESS OF SIZE you can always count on *absolute accuracy* in granite surface plates produced by Herman Stone, originator of these big precision-engineered "flat-tops." Herman Stone has produced the largest area on record. The plate shown here, produced in 1945, is 8' x 16'. Since that time we have made hundreds of large-size granite surface plates—and we recently delivered a 12' x 12' plate to a jet engine plant. A large plate at Herman Stone is a regular part of our normal production.

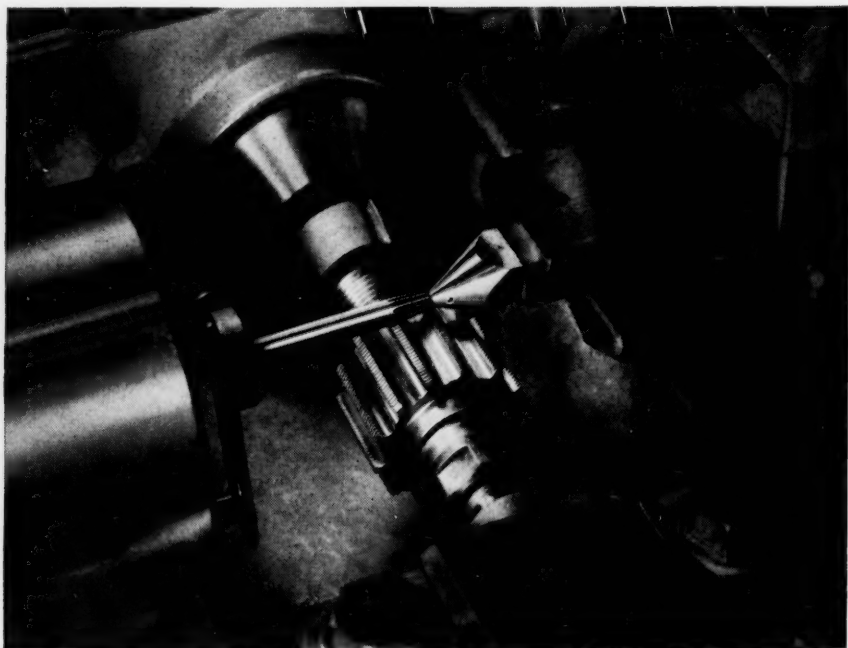
In producing these plates we start with large blocks of granite—warp-proof, corrosion-proof, temperature-resistant and non-magnetic. Then, special machines, designed exclusively for us, enable us to finish our plates more accurately and with closer tolerances over these larger surfaces.

For earlier delivery and higher quality, look to Herman Stone—producer of the *First*, the *Finest*, and the *Largest* granite surface plates. Write for free descriptive folder.

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## *Consistently Better Gears* **WITH CLASS AA HOBS**

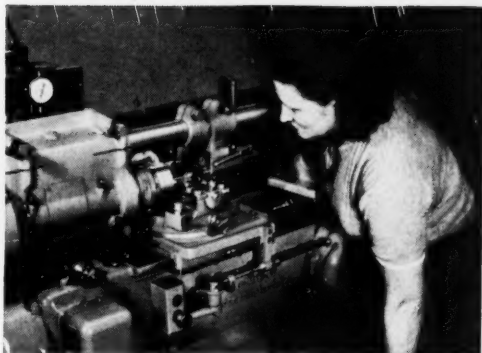
Specialists in the field of instrument gears, G-M Laboratories, Chicago, Illinois employ the latest precision techniques to assure consistent accuracy in their work. Their modern gear department is completely temperature and humidity controlled, and Precision Type Barber-Colman Hobbing Machines are used.

To produce the finest gear accuracy, this firm has standardized on the use of Class AA hobs with taper bores for their precision work. Experience has shown that Barber-Colman Precision No. 6-10 Hobbing Machines, in combination with Class AA hobs, give them the most accurate tooth form and spacing. All gears are finish hobbed, without further finishing operations. Tolerances on the pinions shown here consistently check within .0003" tooth-to-tooth composite error, and .0006" total composite error.

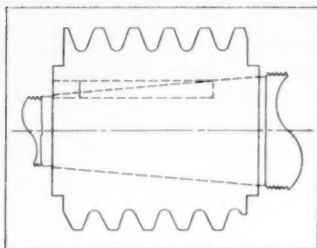
B U I L D E R S   O F   P R E C I S I O N   G E A R

## GREATER NUMBER OF CLOSE TOLERANCE GEARS USING CLASS AA HOBS

Although the hob is not the only factor affecting the accuracy of gears, it does have an important effect, particularly upon the profile of the gear tooth. Class AA hobs are made to consistently closer tolerances than any other hobs, and have proved themselves in actual production for many years. Performance records show that, per sharpening, Class AA hobs produce more gears with close tolerances than any other hobs.



## TAPER BORES RECOMMENDED . . .



Class AA hobs are recommended for the utmost in precision, where other conditions warrant the use of a tool of this class. This accuracy in the tool, however, may be lost if the hob is not properly mounted or trued on the machine. Because of this, Class AA hobs are recommended with taper bores. The taper makes it much easier to true hobs on the arbor where high accuracy requirements are demanded. Compared with the sliding contact on straight hole hobs, the taper provides metal-to-metal contact, eliminating the possibility of an increase in runout during the cutting operation. Time is also saved for the operator because the hob will run as true as the spindle.

Production-line accuracy in all metal cutting operations is constantly approaching closer limits. Gear hobbing is perhaps the outstanding example. When you have gear tooth problems be sure to ask Barber-Colman Hobbing Engineers to work with you. Their long experience in gear cutting is available to you without cost or obligation.



Write for a copy of Hobbing Notes — "Hobbing Accurate Gears"

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HOB SHARPENING MACHINES



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H O B S   A N D   M A C H I N E S   S I N C E   1 9 1 1



# news of the industry

## **New Addition to Sunnen Products Company**

More than 2,000 business and civic leaders of St. Louis recently attended an open house dedicating a new addition to Sunnen Products Company. The new 22,000 square foot, air conditioned building houses the executive offices, honing laboratory, design and development department and customer

service department. The company also held an informal "Family Night" which was attended by more than 1,000 employees, families and friends.

## **Moore Special Tool Company Ships 2,000th Machine**

The 2,000th Moore machine, a Model No. 2 Jig Borer, was recently shipped



View showing new addition to Sunnen Products Co., St. Louis, Missouri

Giving the 2,000th Moore-built machine a special send off are (left to right) Hadar Wahlquist, production manager; Richard F. Moore, president; and Ed Shaw, sales manager.

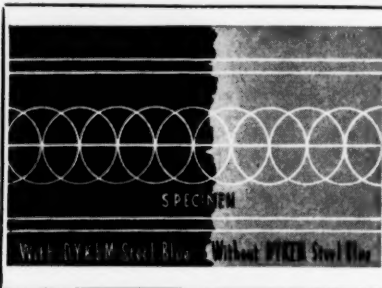


from the Bridgeport, Connecticut, plant of Moore Special Tool Company, Inc., to Eastman Kodak Co., Rochester, N. Y. The total of 2,000 machines does not include the Moore Panto-Crush Wheel Dresser, an accessory produced by Moore for surface grinders. Moore-built machines are now located in 28 states of the Union, Canada, Great Britain, France, Belgium, Holland, Sweden, Norway, Italy, Finland, East Indies, South America, Mexico, Australia, Egypt, China, and Russia.

### Cincinnati Metalcrafts Sells Sebastian Lathe Division

Cincinnati Metalcrafts, Inc., Cincinnati, Ohio, has announced the sale of its Sebastian Lathe Division to the

Sheldon Machine Co., Chicago, Ill. All manufacturing operations will be moved to Sheldon's plant in Chicago. Sheldon is well-known in the manufacture of precision lathes, and this step marks their entry into the heavier geared head field. Cincinnati Metalcrafts plans to devote its entire plant and productive capacity to its major business of producing high-grade industrial sheet metal products.



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### THE DYKEM COMPANY

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### John F. Haller New Allied Engineering Vice President

John F. Haller has been elected vice president in charge of engineering of Allied Products Corp., Detroit, Mich., and Eugene F. Wambold has been named vice president and general manager of Michigan Powdered Metal Products Company, Inc., a wholly-owned subsidiary of Allied.

Mr. Haller who was founder and

president of Michigan Powdered Metal Products until it was acquired by Allied in 1951, brings to his new position many years of experience in the development and production of new products. He also has a national reputation in the field of powdered metallurgy and manufacture and will continue to direct the development work of Michigan Powdered Metal Products from his staff position as chief of Allied's engineering and re-

search.

Mr. Wambold, who came to Michigan Powdered Metal Products in 1952, has



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John F. Haller

had 26 years of manufacturing experience with the General Electric Company. He was formerly vice president in charge of manufacturing for Carboly Department of General Electric Co., Detroit, Michigan.

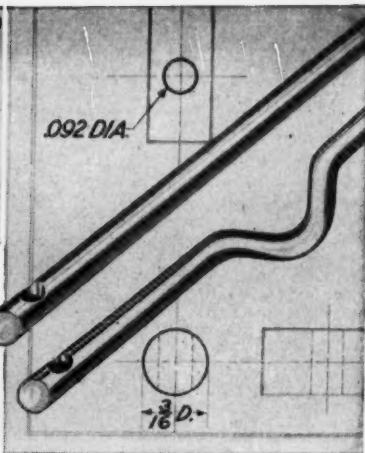
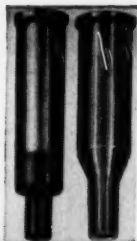
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WHIPSLEEVED  
PUNCHES

increase production

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EXCEEDING  
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## AT GEMCO MANUFACTURING CO. SOUTHTON, CONN.

Mr. Gerard J. Mauro, President of Gemco Manufacturing Company, Metal Stampings and Wire Forms, says: "We are performing C.R.S. Basic wire,  $\frac{3}{16}$  diameter, with straightground whipsleeved Pivot Punches of .092 point diameter. Although this exceeds a 2-to-1 ratio we are getting runs of 35,000. Our own punches achieved runs of only 400 to 500."

"The Pivot Punches have never broken and have held their size through 6 grinds. This has resulted in three-way savings: (1) The price of the punches is actually less than our own cost to manufacture; (2) The economy of a 70-to-1 increase in production; (3) A tremendous savings in maintenance costs."

Get the short story on longer punch life, greater accuracy and punching power, higher production through Pivot Punches, more economical than your own cost to manufacture. Send for catalog and Standard prices. Write DEPT. MM.



**pivot punch and die corp.**

NORTH TONAWANDA, N. Y.



Plant of Cooper Precision Products, Los Angeles, fully-owned subsidiary of Standard Pressed Steel Co., Jenkintown, Pa. (Inset) Harry S. Cooper, president of Cooper Precision Products

### SPS Purchases Cooper Precision Products

Standard Pressed Steel Co., Jenkintown, Pa., has announced the purchase of Cooper Precision Products, 5625 W. Century Blvd., Los Angeles, Calif., manufacturer of quality hex-head bolts for the aircraft industry. While Cooper has become a wholly-owned subsidiary of SPS, both companies will continue to operate independently, and each will retain its own sales organization. No changes in management policy are planned. Harry S. Cooper, well-known in the aircraft industry, will remain as

president of Cooper Precision Products which employs approximately 100 persons. With but two exceptions, there is to be no exchange of personnel between the two companies. SPS has assigned Albert A. Leedom, manager of tooling and quality at the Jenkintown plant, and Charles F. Roberts, chief accountant, to the Cooper staff in Los Angeles.

The new arrangement is said to permit SPS, manufacturer of socket-head screws, to further diversify its products and provide manufacturing facilities in the heart of the Pacific Coast aircraft industry.



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**SPUR • SPIRAL • WORM**

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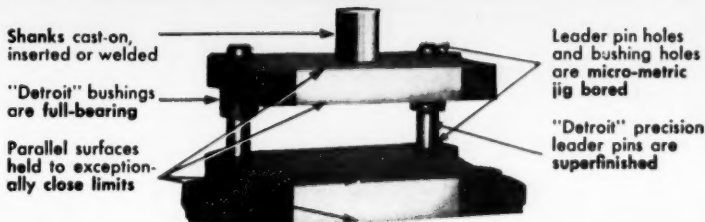
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When you specify "Detroit" die sets, you are assured micro-metric precision that means: 1) Lower costs in mounting die in die set and 2) Longer, trouble-free production runs. Factory-built die sets give you what you pay for—parallelism, squareness and finish.



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DALLAS . . .	TE 3818	ROCK ISLAND, ILL. . .	R.I. 8-2814
DAYTON . . .	HE 3042	ST. LOUIS . . .	FR 6811
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## Gollbach Elected President of Detroit Council of N.T.D.M.A.

Fred W. Gollbach, president of Ace Tool & Die Company and chairman of the board of the newly-formed Ace-Central States Machine Tool Company, has been elected president of the Detroit Council of the National Tool & Die Manufacturers Association. The council represents more than 40 contract tool and die shops in the Detroit

area. Other council officers elected are Daniel Karpinski, owner, Westlof Tool & Die Company, first vice president; H. E. Hurkett, president, Pattern Products Manufacturing Company, second vice president; and H. A. Kramer, partner, Crosstown Manufacturing Company, secretary-treasurer.

Messrs. Gollbach, Karpinski and Hurkett were also elected to three-year terms as directors of the council,

while Frank N. Decker, general manager of Precision Boring Company, and H. D. Kiefer, president of Interstate



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**NOBUR Tools turn a slow bench operation into fast and efficient machine work!** Remove burrs on multi-walled parts with a smooth, clean cutting action that won't mar highly finished surfaces. Eliminate rejects from slow, costly hand work with files, scrapers and abrasives.

**Nobur Tools** are used on any lathe, drill press, portable drill or flexible shaft. Operation of the double-edge cutting blade is easy and safe... no skilled help is required, and the spindle *never* needs to be stopped for either de-burring or chamfering.

**Nobur Tools** cut freely on either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. \*NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/8" diameter. **WRITE FOR FULL DETAILS TODAY!**



Fred W. Gollbach

Tool Company were named directors for two years. Chosen for one-year directorships were David J. Bathgate, vice president, Oval Tool & Die Corporation, and M. L. Jacobs, president, Superior Tool & Die Company.

Parts like these quickly de-burred with



**NOBUR TOOLS** NOBUR MANUFACTURING COMPANY  
717 N. VICTORY BLVD., BURBANK, CALIF.

# NOW

## BOYE' & EMMES

# Stamina

### IN SPECIAL PURPOSE LATHES

Turning requirements strictly special? Boye' & Emmes Long Life, Heavy Duty Engine Lathe stamina can still be yours. For Boye' &

Emmes Special Purpose Lathes are built to the same basic specifications which identify "Long Life" with Boye' & Emmes Engine Lathes.

### HEADSTOCK *Stamina* BECAUSE

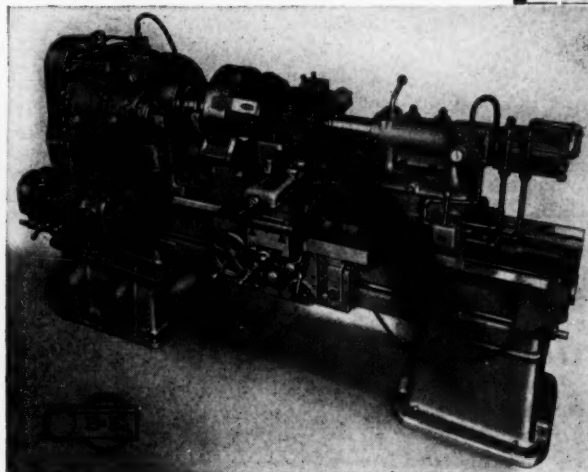
- (1) Gears are in constant mesh, speed changes made through sliding jaw clutches. No gear wear due to shifting.
- (2) Herringbone "back gear" in front of spindle exerts a powerful downward thrust to offset lifting action of cutting tool.

#### WORK:

Double tapering of graphite nipples.

#### METHOD:

Stationary 18" air-operated chuck grips and centers work. Air-operated tailstock rams live spur center into end of workpiece, forcing it into headstock spur driver which extends through 6" center hole in chuck. Chuck then releases workpiece and cutting proceeds, front tool cutting taper from end to center while back tool cuts taper from center to end.



**SPECIAL TOOLING:** Air-operated chuck. Air-operated tailstock. Front and rear tool holders. Taper attachment. Safety stops.

#### WANT DATA?

Write for our free Bulletin No. 604 today and read why stamina is basic in Boye' & Emmes Special Purpose Lathes.

**BOYE' & EMMES**  
**MACHINE TOOL COMPANY**  
123 CALDWELL DRIVE  
CINCINNATI 16, OHIO

## Cross Named to N.M.T.A. Executive Committee

Milton O. Cross, Jr., president of The Cross Company, Detroit, machine tool manufacturer, has been named to the executive committee of the National Metal Trades Association. He will also act as regional counselor in the Detroit area.



Milton O. Cross, Jr.

According to Mr. Cross, the National Metal Trades Association, a 50-year-old organization, concentrates a major portion of its efforts on the promotion of industrial and human relations between employer and employees. It has rendered a particu-

larly valuable service to the smaller companies by advancing the cause of good employer-employee relations and at the same time relieving these companies of the financial burden of maintaining their own individual human relations departments.

## New Stadoil Plant in Operation

Stadoil Mfg. Co., El Monte, Calif., maker of Stadoil Diamond Lapping Oil and other industrial lubricating, grinding and finishing products, has announced that its new plant is now in full operation. This is the third move, each time to larger quarters, that the company has made since its founding in 1935.

Constructed on recently acquired property, the new factory will more than double previous manufacturing facilities and will enable the company

## When so much depends on so little



### Don't settle for less than Chicago "Safety Plus" High Carbon Heat Treated Cap Screws

- For complete hardness from the center all the way out — no soft skin to cause wear or breakage due to fatigue.
- For freedom from scale — cleaner to handle — give a tighter thread fit — have smoother bodies.
- For extra safety — better appearance — ALL at no increase in cost to you.

Your Service-Conscious Industrial Supply Distributor carries a complete stock of our products. Ask him for samples of Chicago "Safety Plus" Heat Treated Cap Screws. His familiarity with your local field conditions enables him to fill your supply needs promptly and correctly. Ask for "Chicago" and get "Safety Plus".

You get these advantages with Chicago "Safety Plus" Heat-Treated Cap Screws.

Corners stay sharp... provide positive non-slip wrench grip... No decarburized surface.

Bodies wear longer... nominal diameter remains to size... No decarburized surface.

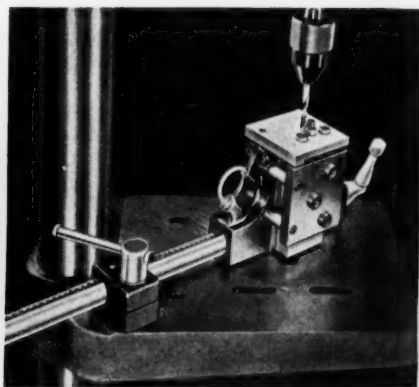
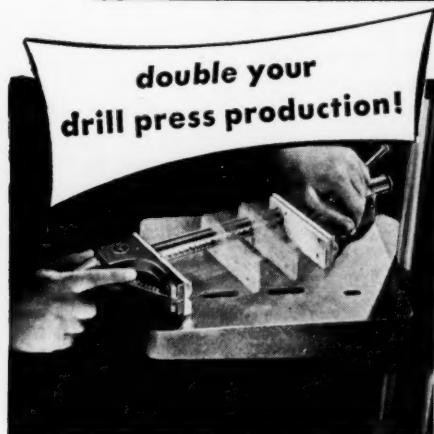
Threads without nicks... hold tighter in engagement... No decarburized surface.



### THE CHICAGO SCREW COMPANY

7505 WASHINGTON BOULEVARD  
BELLWOOD, ILLINOIS

# NEW AMF Float-Lock Instant-Change Safety Vise



IDEAL BASE FOR DRILL JIGS

Retaining its full-floating and locking features, but otherwise completely redesigned, the new AMF Float-Lock *Instant-Change* Safety Vise is faster, huskier, greater in capacity (9" and 12" jaw openings)... the most versatile, most economical work holder yet devised for drill presses!

New ratchet-locking jaw slides *instantly* to desired opening. The other, screw-operated jaw positively locks—or completely releases—work with a mere flick (about  $\frac{1}{4}$ -turn) of the handle.

Vise turns over readily on three sides, permits extensive drilling without removing work. Horizontal and vertical "V" grooves align and grip rounds for end drilling, centering... ideal for angle drilling. Vise serves as low-cost drill jig when locked anywhere on the table... swings out of the way when not needed. Saves so much set-up time, compared with usual work-holding devices, that good operators should easily be able to double their production!



Contact your local AMF Float-Lock distributor for a demonstration. Or write for his name and address and a copy of new, descriptive Folder WF 53-1(a). Wahlstrom Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Ave., New York 17, N. Y.

MODELS ALSO AVAILABLE FOR BAND SAWS



to more easily meet the growing demand for its products. Additional ground, adjoining the new plant, has been purchased to allow for planned future expansion.

### I.D.A. Elects Officers

At its annual meeting and convention held recently at the Edgewater Beach Hotel, Chicago, the Industrial

Diamond Association of America, Inc., elected former vice president William F. Mullins, Werdiger & Mullins Co., New York, president; Piet Smit, J. K. Smit & Sons, Inc., Murray Hill, N. J., first vice president; and Walter J. Meinhardt, Meinhardt Diamond Tool Co., Chicago, second vice president. Elected as directors for two years were retiring president Harold E. Robinson, Wheel Trueing Tool Co., Detroit;

David Reider, Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.; Willard L. Huber, Diamond Tool Research Co., New York; Jan Taey-aerts, Precision Diamond Tool Co., Elgin, Ill.

At the meeting, the association also launched a new publication entitled "The Diamond That Pays for Itself," which is well illustrated to show the applications of industrial diamonds in ways curious to many, throughout all segments of industry. Copies are available free from Industrial Diamond Association of America, Inc., 124 E. 40th St., New York 16, New York.

The advertisement features a large, tilted image of a catalog cover on the left. The cover has the text "FEDERAL OPEN BACK INCLINABLE PRESSES" at the top and "New Press Catalog" in a large, stylized script in the center. To the right of the catalog are four different models of industrial presses, each with a label:

- Standard Presses** 6 to 80 tons
- Dial Feed Presses** 6 to 80 tons
- High Speed Presses** 6 to 80 tons
- Special Presses** 18 to 80 tons

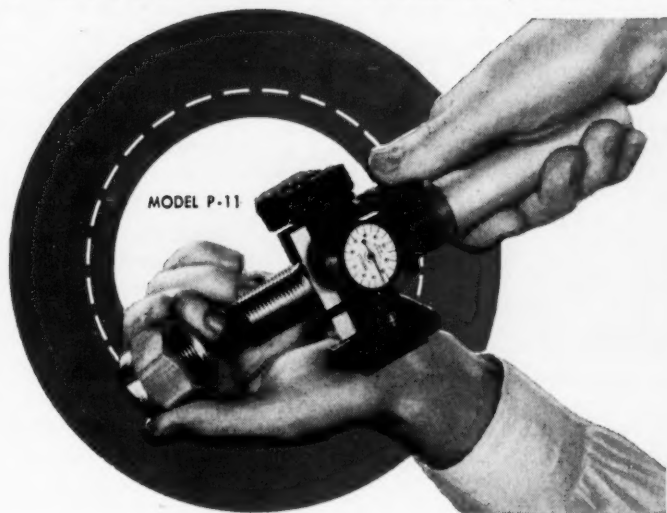
Complete details and illustrations of Federal's high quality line of open-back, inclinable presses, 6 to 80 tons including **Standard Presses, Dial Feed Presses, High Speed Presses, Special Presses.** Shows unusual applications and how to select presses of proper capacity. You will welcome this catalog. It should be in your files.

**Write For Free Copy Today!**

**THE FEDERAL PRESS COMPANY**  
504 Division Street, Elkhart, Indiana

**FEDERAL *Open Back Inclined* PRESSES**  
28 YEARS OF QUALITY CONSTRUCTION

# BRYANT INTERNAL THREAD GAGE



## the revolutionary new gage for statistical quality control on internal threads

The P-11 is a portable comparator gage. A pair of segments, one of which is movable, quickly engage the mating part being inspected. Variation from basic size of P.D., form and lead are shown accumulatively on the dial indicator which reads in .0005". Interchangeable segments inspect all classes of internal threads from 5/16" to 5" dia. Descriptive literature on this gage and other Bryant thread gages is available by sending the coupon.

Bench type gages for external or internal threads are available, with or without squareness-of-face attachment.



# BRYANT

**CHUCKING GRINDER CO.**  
Springfield, Vermont, U. S. A.

MAIL THE COUPON TODAY!

**BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT.**

Please send me illustrated folders giving full information on the Bryant Portable and Bench Thread Gages, MMS

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

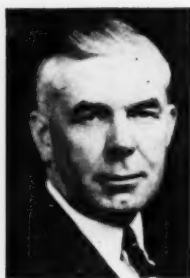
STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



### H. L. Andrews Appointed President of Jones & Lamson

The board of directors of Jones & Lamson Machine Co., Springfield, Vt.,



Hardage L. Andrews

has announced the resignation of K. Hazen Woolson, president of the company. Mr. Woolson, who has resigned after 33 years of service to the firm, was appointed president in 1946 and will continue to

serve as a director. He has also been appointed vice chairman of the board.

Hardage L. Andrews, former executive vice president of the General Electric Company, has been appointed to

succeed Mr. Woolson as president. Mr. Andrews was elected an executive vice president of G. E. in 1950 and was placed in charge of the industrial products and lamp group. He remained in that capacity until the Fall of 1951 when he retired under the company's optional retirement plan.

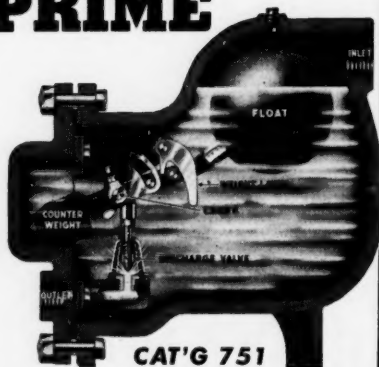
### \$13,500 Arc Welding Award Program for Selected Business and Service Establishments

The James F. Lincoln Arc Welding Foundation has announced a \$13,500 Arc Welding Award Program for Selected Business and Service Establishments. Awards will be made to individuals in non-industrial businesses and service establishments, including 40 different types covering nearly all non-industrial types of organizations. Written descriptions of how arc weld-

## Nicholson Air-Gas-Steam Traps NEVER NEED PRIME

Nicholson weight-operated traps, under no condition, leak medium from a power transmission system. This prevents the costly loss of air, gas or steam occurring when inverted bucket traps lose their prime. Under such conditions Nicholson traps hold tight because they do not depend on buoyancy of float to raise valve. 3 types; pressures to 1500 lbs.

136 Oregon St., Wilkes-Barre, Pa.



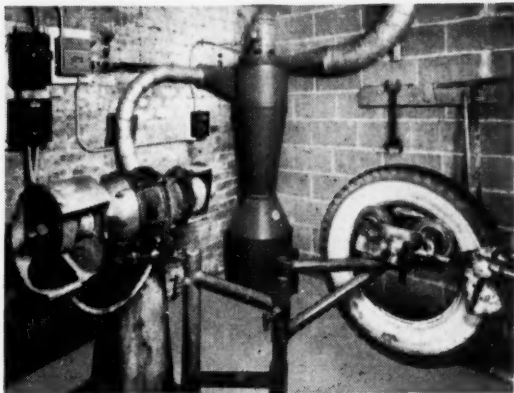
**W. H. NICHOLSON & CO.**

**TRAPS · VALVES · FLOATS**



Ride 'em with—  
**TORIT**  
 Cyclone DUST SEPARATORS

**TO RID PLANTS  
 OF ABRASIVE  
 DUSTS**



Pecos Pete, legendary cowboy, tamed cyclones for sport. Torit makes them useful.

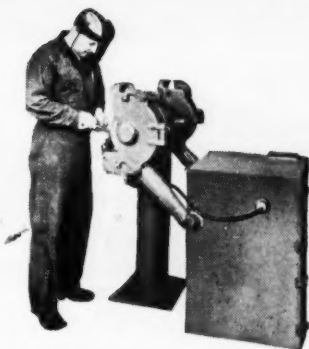
The ability of a cyclone type Torit Dust Separator to handle large volume is well illustrated above. This model 18-FM unit is making a clean job of getting rubber and fabric dusts from a tire buffing wheel.

If you want to clean up your plant the safe way, install Torit Dust Separators. Like Pecos Pete they'll tackle most any industrial dust problem and run it down to a gentle zephyr. Do it economically too, with little or no interference with present and future production layouts. To get the dope shoot us a line.

see our catalog in



or write for copy



*Torit Dust Collectors are available in both cabinet and cyclone types, in sizes ranging up to 5 h.p.*

**TORIT MANUFACTURING CO.**  
 296 Walnut Street St. Paul 2, Minn.

ing is or can be used in the maintenance or operation of the business or service will receive awards ranging from \$1,000 to \$25. A total of 191 awards will be made to individuals in these businesses.

None of the selected businesses or establishments is in a metal fabrication field where welding is generally used. These have been eliminated to limit the program to people who have simi-

lar opportunity for using welding. An illustrated booklet of rules for the program is available from The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

### Hi-Duty Drill Works Observes 50th Anniversary

Hi-Duty Drill Works, Fleetwood, Pa., established by W. R. Down, is observing the 50th anniversary of the founding of the original Down Tool Works. The Hi-Duty plant was built by Mr. Down in 1923 and was operated by him until his death in 1944, when the proprietorship passed to J. C. Schwoyer with Samuel P. Smith as general manager. Dr. Clark R. McClelland was appointed office manager in January 1953 to facilitate the handling of an increased volume of business.

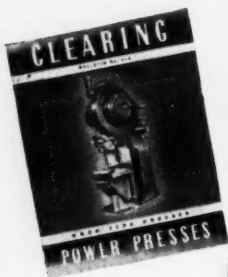
The Down flat twisted and rolled section drills, particularly step drills and various other types of specials, are nationally known.

## Clearing Horn-Type Presses

A Press of all-round  
usefulness

45 to 200 tons  
capacity

60-ton horning press



### New Catalog—

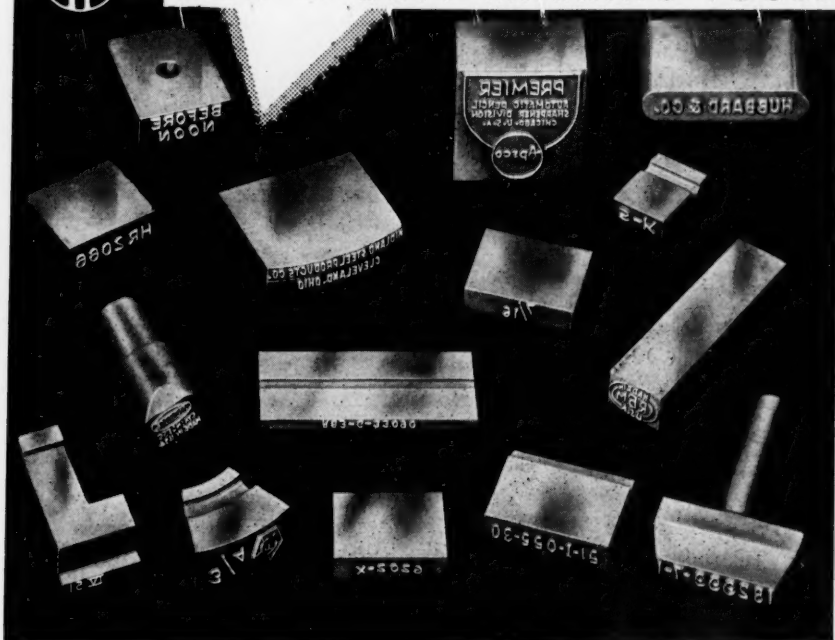
A free copy of the new catalog on Clearing horning presses will be sent to you on request. Write on company letterhead.



CLEARING MACHINE CORPORATION • 6493 WEST 65TH STREET • CHICAGO 38, ILLINOIS  
HAMILTON DIVISION • HAMILTON, OHIO



## SHARP PERMANENT MARKING WITH HI-DUTY MARKING TOOLS



For legible permanent marking of metal components use engraved lettering tools. Precision engraved dies and inserts for indenting or embossing identification on your parts will



### COMPLETE MACHINE FACILITIES TO PRODUCE

- Hand Stamps
- Engraved Inserts for Dies
- Shank Style Stamping Dies
- Embossing Dies
- Code Stamps
- Steel Type
- Numbering Heads
- Marking Machines
- Nameplate Marking Equipment

1. Improve appearance.
2. Advertise throughout life of part.
3. Facilitate reordering.

Write for free catalog on Production  
Marking Equipment.

**GEO. T. SCHMIDT, INC.**  
1806 West Belle Plaine Avenue  
Chicago 13, Illinois

## Lincoln Announces New Linc-conditioning Division

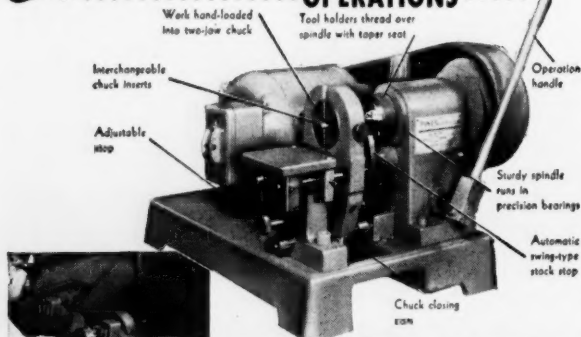
Straight-line mass production techniques and economies are now being applied by The Lincoln Electric Co., Cleveland 17, Ohio, to the reconditioning and rebuilding of arc welding equipment. The new rebuilding techniques are employed in a new operating division called the Linc-conditioning Division, which utilizes conveyor

lines and line operations to realize efficiencies in rebuilding welders, work which was normally accomplished on a one-at-a-time basis.

The new division, under the supervision of Robert Dalzell, will rebuild, for users of Lincoln equipment, their engine-driven motor generator and a.c. welders. By rebuilding welders in production lots, assembly line methods of dismantling, reconditioning, and reas-

sembly can be used to achieve production economies not readily possible if only one or two machines are processed at one time.

## Speeds ..... CHAMFERING, POINTING, FACING, REAMING ..... OPERATIONS.....



### EXCLUSIVE FEATURES OF PINES END-FINISHER SAVES TIME ON TUBE, PIPE, BAR JOBS

At Kold-Hold Mfg. Co., two Pines Air-Operated Machines with single foot control speed tube deburring and facing operations. One operator produces 1200 tube ends per hour.

Pines Portable End-Finisher is especially designed for fast, accurate work. Small and compact, its exclusive operating features save time. Forward travel of operating lever clamps and feeds work to rotating cutters in one pass. Operator always has one hand free for stock handling. Equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, grease-sealed precision bearings. Unit illustrated handles stock diameters up to 2". Maximum feed stroke is 1 1/4". Automatic air-operated units for higher production work and larger sizes up to 5" capacity are also available.

Write for Free  
Bulletin



Write today for more facts. Learn how these machines are built to save time on a wide range of work.

**PINES** ENGINEERING CO., INC.  
Specialists in Tube Fabricating Machinery

644 WALNUT • AURORA, ILLINOIS

## Welding Design Course

The Lincoln Electric Co., Cleveland 17, Ohio, has announced a complete course for self-study in the WelDesign System of creating low-cost machine designs in steel. The complete course includes (1) a manual that outlines the system step-by-step, giving data, charts, nomographs, tables, cost calculator, process selection guides, and time

# When Reading Proofs Editors Use Marking Devices

*tr* TRANSPOSE    *C* CLOSE UP  
# INSERT SPACE    *[ ]* BRACKETS

When proof reading copy, busy editors find marking devices indispensable to indicate the type of corrections, transpositions, deletions, additions, and changes required.



## INTERCHANGEABLE TYPE and TYPE HOLDER SETS

The faces of CADILLAC Steel Letters and Figures combine a high degree of hardness with toughness, insuring especially long life. All CADILLAC Marking Type and the recess in Type Holders are made in standardized dimensions. This means that type will fit interchangeably in hand holders, marking machine holders or punch press holders designed for the size type specified. Due to the precision adhered to in manufacturing, they will when assembled in any holder make impressions in perfect alignment.

For full information write for Bulletin SE-130

## CADILLAC STAMP CO.

FACTORY and OFFICES

17319 RYAN ROAD • DETROIT 12, MICH.



### HEAVY BEVEL HAND STAMPS

CADILLAC Heavy Bevel Letters and Figures combine a high degree of hardness with toughness, insuring exceptionally long life.



### HAND STAMP SYMBOLS

A system of distinctive symbols for inspection and confidential markings. Write for Symbol Chart.



charts; (2) self-study supplementary notes; (3) WelDesign cost calculator slide rule; (4) moment of inertia rule; (5) set of weld standards on onion skin for duplication; and (6) copy of the 1,300-page "Procedure Handbook of Arc Welding Design and Practice."

The entire set of WelDesign material for self-study is available from The Lincoln Electric Company for a price of \$10.00, postpaid in U.S.A., and \$12.00 elsewhere.

### Pivot Punch Offers Technical Program on Parts Punching

Pivot Punch & Die Corp., North Tonawanda, N. Y., is offering an interesting program on parts punching which comprises a talk illustrated with slides and a large exhibit of punched parts

along with production results. A feature of the presentation is an invitation to attending guests to present their most difficult punching problems for solution. In many cases, the strip or the piece-part, together with broken punches, is presented for on-the-spot suggestions for improvement.

Pivot Punch offers this program and the services of its staff of technical experts to A.S.T.E. chapters and other similar technical organizations throughout the country. The presentation is also offered to private industries as a technical program or as a training program for production employees. Persons interested in the program may write to Mr. Edmund J. Klonowski, Sales Manager, Punch Division, Pivot Punch and Die Corporation, North Tonawanda, New York.

**Beverly THROATLESS SHEAR**

*Cut any Shape...* **STRAIGHT OR IRREGULAR**



**B-3 with Ball Bearing Hold Down**

Make any cut—curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models—capacities 18 gauge to 3/16" mild. All shears equipped with High Carbon, High Chrome Blades.

**INSIDE SLOTTER**

**8" Reach—16 ga. cap.**  
Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2 1/2" x 1/16" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

**See your Beverly Dealer or write for Illustrated catalog.**

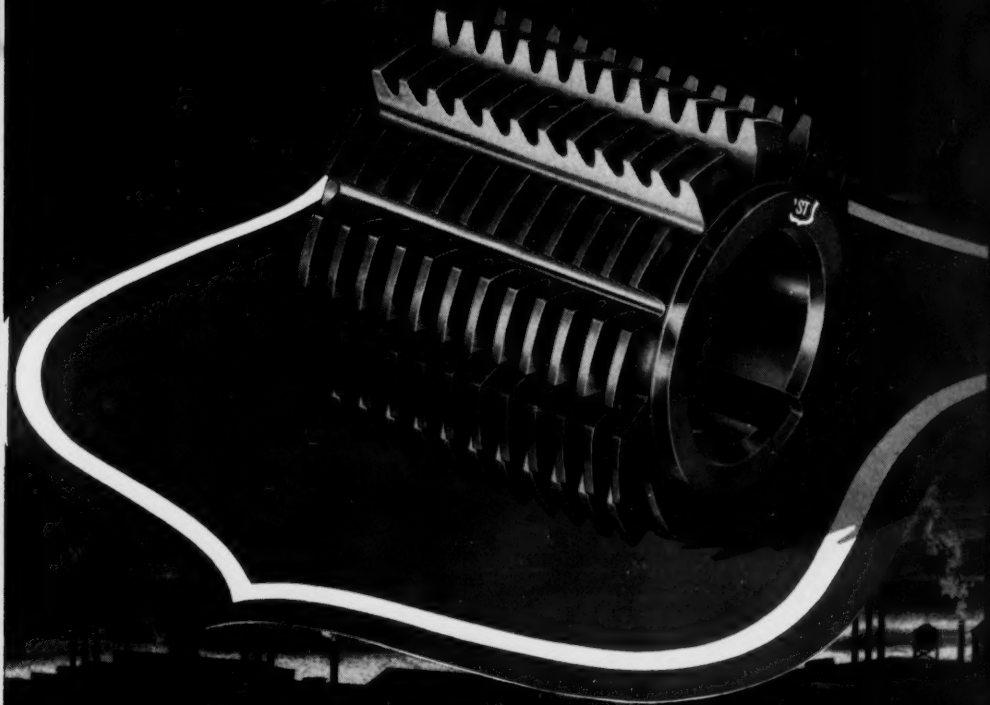


**BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.**



Red Shield says:

*"STANDARD for tough jobs  
since 1881"*



*as near as your telephone*



Call your Industrial Supply Distributor  
for Shield Brand Hobs. Specialized  
factory service available everywhere.

# STANDARD TOOL Co.

3950 CHESTER AVENUE CLEVELAND 14, OHIO



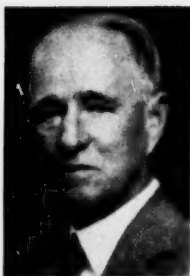
NEW YORK • DETROIT • CHICAGO • DALLAS • SAN FRANCISCO

THE STANDARD LINE: Twist Drills - Reamers - Taps - Dies - Milling Cutters - End Mills - Hobs - Counterbores - Special Tools

## Edward Payson Bullard, Jr.

Edward Payson Bullard, Jr., pioneer and leader in the machine tool industry for many years, died recently at his home in Fairfield, Connecticut. Mr. Bullard joined The Bullard Company in 1892 as an apprentice machinist, later serving as a draftsman and then as assistant superintendent. In 1900, he went to Europe where he represented the firm for two years. On

his return, he was appointed general manager of the plant, the position he held until 1907. In that year, he was elected president of the company, following the death of his father who was founder of the company. Of the 60 years spent with the company, Mr. Bullard served as president for 40 years.



Edward Payson Bullard, Jr.

Mr. Bullard retired as president of the company in 1946, at which time he was elected chairman of the board of directors. In 1951, he was named chairman emeritus of the board.

## Bryant Machinery & Engineering Company Moves to New Location

Bryant Machinery & Engineering Company has moved to a new location at 640 W. Washington Blvd., Chicago 6, Ill., where it can better serve customers and representatives locally, nationally, and abroad. A building has been especially constructed to consolidate general offices with sales service and engineering, as well as a demon-

**Standardize on**  
**hall COLLET CHUCKS**

for  
**SPEED,  
ACCURACY,  
ECONOMY**

**Automatic adjustment speeds up production** in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

**SATISFACTION GUARANTEED!**

**Made in Two Sizes to Fit Your Requirements:**  
Model A...1" (max. capacity 1-1/16")  
Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated  
No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept.

**HALL MANUFACTURING COMPANY**  
622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

**You Need an Extra Hand Now  
to Speed Up Production!**

**HEIMANN TRANSFER SCREW SETS**

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

**IN 11 SIZES—No. 6 to 3"**  
N.C. In all S.A.E. sizes.

**HEIMANN MFG., CO. • URBANA, OHIO**

# CLUTCHES by ROCKFORD



## High Speed Hole "Wizard" Drills 4" Holes in Steel

Peak production, with minimum torsion, are popular features of this American Tool Works hole Wizard. ROCKFORD Pullmore CLUTCH power transmission control also is an important feature of this efficient machine tool. Let ROCKFORD clutch engineers submit suggestions for improving the controls in your new machine designs.

Send for This  
Handy Bulletin

Shows typical  
installations of  
ROCKFORD  
CLUTCHES  
and POWER TAKE-  
OFFS. Contains diagrams  
of unique applications.

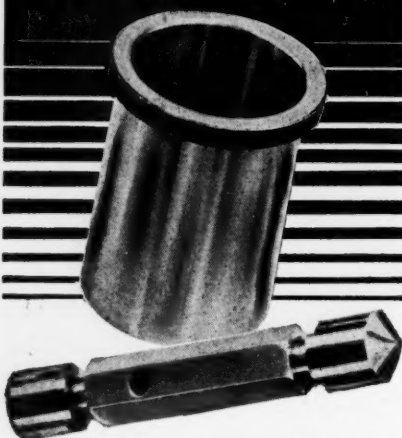


Furnishes ca-  
pacity tables,  
dimensions and  
complete speci-  
fications.

**ROCKFORD CLUTCH DIVISION** BORG-  
WARNER

300 Catherine Street, Rockford, Illinois, U. S. A.

## FOR ACCURACY IN PRODUCTION



### ECONOMY PRECISION BUSHINGS AND GAGES WORK HAND IN HAND



- A.S.A. standard and special drill jig bushings.
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.

*Write for bulletin and price list.*

**Economy**  
**TOOL & MACHINE CO.**

1827 S. 68TH ST., MILWAUKEE 14, WIS.

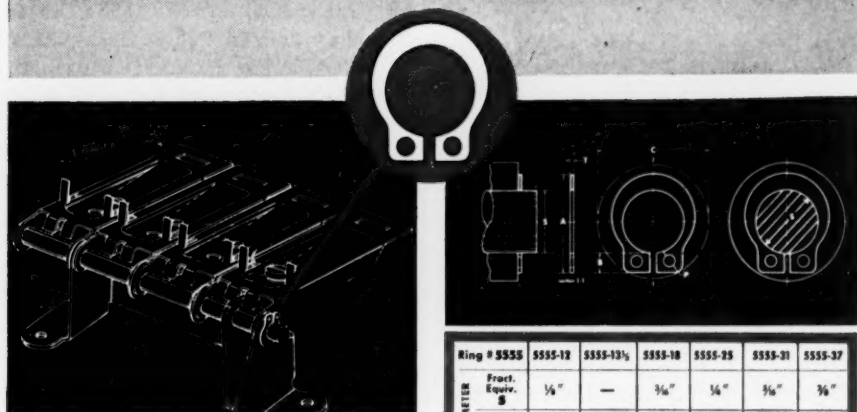
stration shop where machine tools can be operated under production conditions and the most advanced processes can be demonstrated. The new location is close to Chicago's loop and the important railway stations and leading hotels, with quick, easy access from Wacker Drive and the new Congress Street superhighway.

### Republic Steel Enters Powdered Iron Field

A new patented process for the production of powdered iron has been perfected by Republic Steel Corp., Cleveland, Ohio. Republic will utilize the process for the commercial production of iron powder in a new plant, the erection of which will start soon in Toledo, Ohio. About 100 companies in the United States use iron powder to form gears and similar precision mechanical parts by pressing the powder between dies under high pressure and subsequently heating the pressed part to temperatures at which the particles of iron weld themselves together, forming a unified mass with a smooth surface usable without subsequent machining, thus permitting such parts to be mass produced quickly and economically.

Republic also proposes to make iron powder for application in the field of flame scarfing and cutting where substantial quantities are used to intensify the heat of the flame, and for which the company has extensive use in its own steel plants. Construction of the plant in Toledo is expected to be completed sometime in the summer of 1954. Because the process is largely automatic and continuous in operation, employment will probably not exceed 100 persons.

**New Waldes Truarc GRIP Ring requires no groove,  
holds fast by friction, can be used over and over again**



The Waldes Truarc Grip Ring is a new, low cost fastener that provides a positioning shoulder secure against moderate thrusts or vibration. Installed on a straight ungrooved shaft, the Truarc Grip Ring can be assembled and disassembled in either direction with Truarc pliers.

The Grip Ring can be installed tightly against a machine part in order to take up end-play. The basic Truarc design principle assuring complete circularity around periphery of the shaft and the ring's unusually large radial width combine to exert considerable frictional hold against axial displacement. The ring can be used again and again.

Find out what Waldes Truarc Retaining Rings can do for you. Send us your drawings. Waldes Truarc engineers will give your problems individual attention without obligation.

Ring #	SSSS	SSSS-12	SSSS-13½	SSSS-18	SSSS-25	SSSS-31	SSSS-37
Fract. Equiv. S	¾"	—	¾"	¾"	¾"	¾"	¾"
Dec. Equiv. S	.125	.136	.187	.250	.312	.375	
SHAFT DIAMETER							
TOL.	±.002	±.002	±.002	±.002	±.003	±.003	
Thickness							
T	.025	.025	.035	.035	.042	.042	
TOL.	±.0015	±.0015	±.002	±.002	±.002	±.002	
Length							
A	.268	.285	.364	.437	.553	.626	
Lug							
B	.078	.078	.097	.097	.141	.141	
Hole							
P	.042	.042	.042	.042	.078	.078	
Min. Ring C							
Clear	.33	.34	.44	.50	.67	.73	
Approx. Ultimate Thrust Load (lbs)	20	20	25	35	50	60	



SEND FOR NEW CATALOG

**WALDES  
TRUARC**

**RETAINING RINGS**

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS AND PLIERS ARE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 2,582,847; 2,582,849; 2,479,932; 2,480,231; 2,480,241; 2,480,242; 2,480,243; 2,481,149; 2,482,336; 2,483,922; 2,487,653; 2,487,655; 2,491,396; 2,492,567 AND OTHER PATENTS PENDING.



Waldes Kohinoor, Inc.,  
47-16 Austel Place, L.I.C. 1, N. Y.

MM085

- ☐ Please send me sample Grip-Rings  
(please specify shaft size \_\_\_\_\_)
- ☐ Please send me the complete Waldes Truarc catalog.

(PLEASE PRINT)

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Business Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



## Dearborn Spring and Manufacturing Company Incorporates on 10th Anniversary

S. Harold Edlund, founder of the Dearborn Spring and Manufacturing



S. Harold Edlund (left) and Robert J. Tolonen

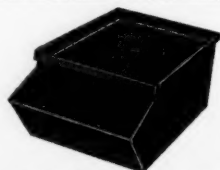
Company, Detroit, producer of precision parts for the aircraft and hy-

draulic industries, has announced the incorporation of his company on its tenth anniversary. Mr. Edlund came to Detroit from Sweden at the age of 13. Previous to starting his own company, he was with Great Lakes Thread Company and Ex-Cell-O Corporation.

Under the new corporate setup, Mr. Edlund becomes president and chairman of the board. Robert J. Tolonen, who came to Dearborn Spring from the Ford Motor Company in 1951, has been promoted to vice president and general manager. Other officers of the new corporation include Mildred Edlund, secretary and treasurer; Attorney Jarl Andeer, legal counsel; and Ralph M. Law, accounting supervisor. Dearborn Spring now occupies a modern plant at 14420 Joy Road, Detroit 28, Michigan, and has fifty employees.



# "Stack Up"



Sterling Bin Front "Top Rim" Steel Stacking Box.  
Size: 18" x 12" x 6".

## THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box... no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling "Top Rim" Steel Stacking Box with drop handles.  
Size: 18" x 12" x 6".



# Sterling

Quality Handling & Storage Equipment



# Even if water-soluble oil coolants were free ... you could still afford to buy *Lusol*

Because Lusol dissipates heat so fast, tools work cooler ... stay sharp longer. You can increase machine speeds and feeds, get greater production per machine and use fewer tools to do it. It's been proved! Lusol allows tool savings and production increases that more than make up your coolant costs.

Water is the answer! Lusol *conditions* water—the best cooling agent—and makes it suitable as a machine coolant. Lusol is a lubricant, a cleaner, a rust preventive and a germicide. It contains no oil, so it won't smoke even at breakneck machine speeds.

## ***Cutoff saws and milling cutters stay sharp longer ...***

Expensive replacement is reduced by keeping milling cutters and saws supercool. Working with Lusol lengthens their cutting life even at highest speeds.

## ***Metal-turning machines increase production ...***

Machine operators can boost production ... really hog metal with Lusol on the job. Yet tools, work and chips stay cool. Working areas stay cleaner, without smelly cutting oil spattering on floors and workers' clothing.

## ***Grinding operations require less down time ...***

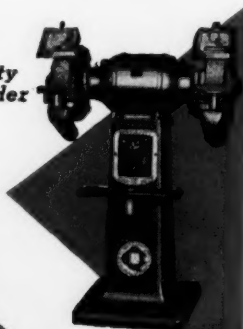
Wheels stay clean, hence run longer between dressings. Lusol's detergent action cleans wheels as it cools. Machines, too, stay clean.

**Data Available.** Write for *Lusol Gets to the Point* describing actual case histories where Lusol has increased production from 50% to 500%. This booklet also discusses Lusol's anti-weldant and cleaning properties, plus its ability to prevent irritation to workers' skin.

**F. E. ANDERSON OIL COMPANY**  
**Box 216-J, Portland, Connecticut**

## **"Time Savers in any shop"**

**Heavy Duty  
Floor Grinder**



**Heavy Duty  
Bench Grinder**

Here's extra value in long life, low maintenance and low first cost. QUEEN CITY Bench and Floor Grinders and Buffers have all the quality features . . . ball bearings, heavy duty motors, etc. . . in a complete range of sizes and models . . . all priced far below comparable grinders and buffers.

**QUEEN CITY  
MACHINE TOOL CO.**

**WRITE TODAY  
FOR DETAILED  
LITERATURE**

**QUEEN CITY MACHINE TOOL CO.**  
3901 Kellogg Avenue, Cincinnati 2, Ohio

### **Universal American Corporation Purchases Controlling Interest in Norma-Hoffman**

Controlling interest in the Norma-Hoffman Bearings Corporation has been purchased by the Universal American Corporation of New York, which is headed by Francis S. Levian, from the Hoffman Mfg. Co., Ltd., Chelmsford, England. The transfer of the ownership of the bearings company ended the British control which has been in effect for nearly 30 years.

The Norma-Hoffman Bearings Corporation has its main office in Stamford, Conn., with warehouses and sales offices throughout the United States. It is engaged in the manufacture, sale, and distribution of bearings, including precision ball bearings, cylindrical roller bearings, and thrust bearings, as well as certain related products such as lubricating greases and cup mountings for bearings.

Norma-Hoffman will continue to operate as a separate company, with no change of officer personnel, except that Herbert M. Singer, of the firm of Levian & Singer, has been elected chairman of the board. Officers of Norma-Hoffman who were re-elected are William L. Hubbard, president, a post he has held since 1949; Robert L. Miller, vice president in charge of sales; Dwight Batesole, vice president in charge of engineering; A. J. Schmiel, secretary and treasurer; and F. Milton Ivory, assistant treasurer. Leonard Morey, president and board member of Morey Machinery Co., Inc., New York, has been elected to the board of directors of Norma-Hoffman.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



In One Cut..

DEAD  
TRUE  
TO  
SIZE



with AUTOLOCK

Operation: Keyway Cutting  
Chuck: Autolock #SC 40  
International  
Cutter: Autolock Slot  
Drill #ALD 15 -  $\frac{1}{2}$ "  
Material: 28 Ton Steel  
Depth of Cut: .390  
Width of Cut:  $\frac{1}{2}$ " + .001" - .000"  
Feed: 6.8" per min  
Speed 660 RPM

KNOWN and PREFERRED THE WORLD OVER

**Clarkson**

Clarkson Incorporated  
320 Ontario Street  
Toledo, Ohio  
Gentlemen

Send full information and prices on AUTOLOCK Cutting  
Tools and Chucks to.

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STREET.....  
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INCORPORATED

DEDLCK CHUCKS • AUTOLOCK CHUCKS • MILLING CUTTERS • CLARKSON CUTTER GRINDERS

320 Ontario St., Toledo, O.

## Metal-Working News in Brief

Morse Twist Drill & Machine Co., New Bedford, Mass., has appointed **Fred Duff** to the district management of Morse operations in Chicago and surrounding areas. **Rex Bennett** has been appointed district manager to succeed Mr. Duff in metropolitan New York.

Solar Steel Corp., Cleveland, Ohio, has announced the appointment of **H. M. Rittger** as general sales manager of tool steel products with headquarters at the company's Cincinnati plant. Mr. Rittger will also supervise the sales of bar and tube steel products in Cincinnati. The company has also announced the appointment of **Louis B. Weiskopf** as district sales manager for

the Chicago area, covering Illinois, Wisconsin, Minnesota, Iowa, western Ohio, and northern Indiana.

— o —

**Kurt Orban Co., Inc.**, New York, N. Y., has appointed the **A. J. Rod Co.**, Houston, Texas, as distributor for the company's line of German-made machine tools in Houston and Southern Texas.

— o —

**Robert F. Holmes**, for seven years sales manager of Universal Engineering Sales Company, sales agent for Universal Engineering Co., Frankenth, Mich., died recently while on a sales trip to Kenosha, Wisconsin. He was 49.

For  
**"On the Spot"  
DELIVERY** ... from **STOCK**  
*Chicago*

**"DIE CAST" HAND WHEELS**



**"NG" Series**  
Sizes from  
2" to 2 1/2"



**"NR" Series**  
Sizes from  
2 3/4" to 3 1/2"



**"NS" Series**  
Sizes from  
4 1/2" to 6 1/4"



**"NK" Series**  
Sizes from  
1 1/2" to 2"



**No. 14 Knob**  
Diameter 1 1/8"

WRITE  
FOR  
CATALOG No. 1-1152

MFG'D BY  
**Chicago DIE CASTING MFG. CO.**  
2310-14 WEST MONROE STREET  
CHICAGO 12, ILLINOIS

**Sid Tool**  
Company

**WHY WAIT FOR SPECIAL TAPS?**

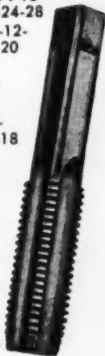
**... Has them IN STOCK  
for IMMEDIATE DELIVERY!**

**HIGH SPEED**

**SPECIAL**

**RIGHT HAND TAPS**

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	7/16	12-16-18-22-24-27-28-30-32-36-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24
5	30-32-36-48-80	1/2	12-14-16-18-22-24-26-27-28-30-32-40	1-11/16	10-12-14-16-18-20-24
6	36-40-48-56-60	9/16	16-20-24-27-28-30-32-40-48	1-3/4	8-10-12-14-16-18-20-24
7	32-40	5/8	12-14-16-20-24-27-28-32-36-40	1-13/16	8-10-12-14-16-18-20
8	24-30-36-38-40-44-48	11/16	11-16-18-20-24-27-28-30-32	1-7/8	8-10-12-14-16-18-20-24
9	24-28-32-40	3/4	9-11-12-14-18-20-24-26-27-28-32	1-15/16	8-10-12-14-16-18-20-24-28
10	28-30-36-40-48-64	13/16	10-14-18-20-32	2	4 1/2-8-10-12-16-18-20
12	20-28-32-36	7/8	10-12-16-18-20-24-27-28-32	2-1/16	12-14
14	20-24-28	15/16	8-9-10-12-14-16-18-20-24-32	2-1/8	12-16-20
1/16	60-64	1	10-12-16-18-20-24-27-32-40	2-3/16	12-16
5/64	72	1-1/16	12-14-16-18-20-24	2-1/4	4 1/2-8-12-14-16-18
3/32	48	1-1/8	8-10-14-16-18-20-24-32	2-5/16	12-18
7/64	48-56	1-3/16	8-10-12-14-16-18-20-24	2-3/8	12-16-18
1/8	32-40	1-1/4	8-10-14-16-18-20-24-32	2-1/2	8-10-12
5/32	32-36-40	1-5/16	12-14-16-18-20-24-32	2-9/16	18
9/64	36-40	1-3/8	8-10-14-16-18-20-24	2-5/8	12-16-20
11/64	36	1-7/16	8-10-12-16-18-20-24	2-3/4	16
3/16	20-24-32	1-1/2	8-10-14-16-18-20-24-28	2-7/8	8-12-16
13/64	32	1-9/16	18-20-24	3	8-16
7/32	24-28-32			3-1/4	8-12-16
1/4	18-24-26-27-30-32-36-40			3-1/2	8-12-16
5/16	16-20-22-27-28-32-40			3-7/8	6
3/8	12-16-18-20-27-28-32-36-40-48			4	8-12



**HIGH SPEED LEFT HAND TAPS**

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

**• SPECIAL AND LEFT HAND DIES IN STOCK**

Prices on Application—We are always adding new sizes

**NOTE:** Oversize—Undersize—Metric—64th—and  
32nd Size Taps Available for Quick Delivery.

**DEALER INQUIRIES INVITED**

**SID TOOL COMPANY, INC.**

CUTTING TOOL SPECIALISTS

126 LAFAYETTE STREET • NEW YORK 13, N. Y.

• Are you on our  
monthly mailing  
list? Write Dept. M.

PHONE: BE 3-4270



## Metal-Working News in Brief

Kennametal Inc., Latrobe, Pa., has appointed **Wallace T. Allin** as a representative in the Los Angeles district office, 2612 Leonis Blvd., Los Angeles, Calif.; **William W. Lind** as a represen-

tative in the Chicago office, 5830 W. 26th Street; and **Mark Rollinson** and **Leonard Spicer** as representatives in the Detroit office, 5531 Woodward. The following service engineers have also been appointed: **William F. Barbour**, Cincinnati; **Earle S. Cummings**,

St. Louis; **Warren H. Eisenberg**, Milwaukee; **Warren C. Foster**, Detroit; **Raymond Guenther**, Southern District; and **Robert A. Welsh**, New England.

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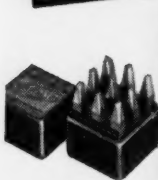
**Oscar E. Schlichter**, founder of The Hamilton Tool Co., Hamilton, Ohio, died recently at the age of 78. Born in Germany, Mr. Schlichter was well-known in the machine tool field.

— o —

**Adamas Carbide Corp.**, Harrison, N. J., manufacturer of standard carbide tools, tool tips, dies, and wear parts, has announced the appointment of **Specifax Corp.**, 555 E. Walnut St., Pasadena, Calif., as its sales representative for the State of California.



EVERY PARKER MARKING TOOL AND DIE IS BUILT TO GIVE CONSISTENTLY SUPERIOR SERVICE — PERMANENT, RAZOR-SHARP IMPRESSIONS DAY AFTER DAY, JOB AFTER JOB IMPROVE PRODUCT QUALITY, ASSURE PRODUCTION ECONOMY!



STEEL NUMBER SETS



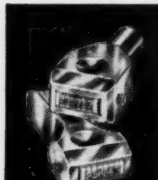
STEEL LETTER SETS



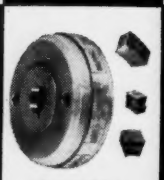
STEEL HAND MARKING DIES



STEEL TYPE



TYPE HOLDERS



INSERT ROLL MARKING DIES



CODING TYPE



ROLL MARKING DIES



PRESS MARKING DIES



HOT STAMPING DIES

SEND TODAY FOR THE NEW 36 PAGE PARKER CATALOG — A comprehensive reference of Parker products and services available to industry.



THE  
**PARKER**  
STAMP WORKS, INC.  
MARKING DIE • REQUESTED DIE  
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

# self releasing precision expanding mandrels

**.0005" ACCURACY GUARANTEED**

\* ERICKSON PRECISION EXPANDING MANDRELS provide the ideal means of gripping on interior surfaces. With them, close tolerance machining or checking operations can be accomplished with exceptional speed.

The mandrel sleeve, alternately slotted from each end, expands and grips along its entire length . . . accommodates variations over  $\frac{1}{32}$ " range.

A single mandrel shank is usable with an entire series of sleeves and can handle an enormous variety of work.

Besides the illustrated standard models, multiple sleeve and other special designs can be adapted to meet specific job requirements.

Sleeves can be machined to fit splines, undercuts, threads, and other internal contours.

A-7810

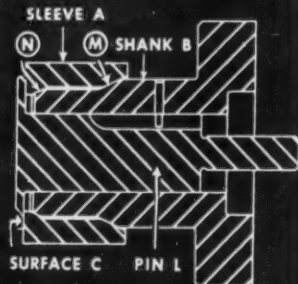


## the inside story...

Sleeve "A" is automatically lined up concentrically with the axis of shank "B" by the sleeve's cam surfaces "M" and "N". These mate with the cam surfaces of the shank to within .0001". Sleeve "A" is open slotted at both ends. When pin "L" is drawn back against surface "C", sleeve "A" expands equally over its entire length. Release of this force instantly relieves the mandrel's grip. Some models use locknuts to expand the sleeve instead of the drawpin in the diagramed design.

ERICKSON PRECISION HOLDING TOOLS INCLUDE: Collet Chucks, Floating Holders, Air Chucks, Tap Chucks, and Speed Indexers.

Write for Catalog "J" Today



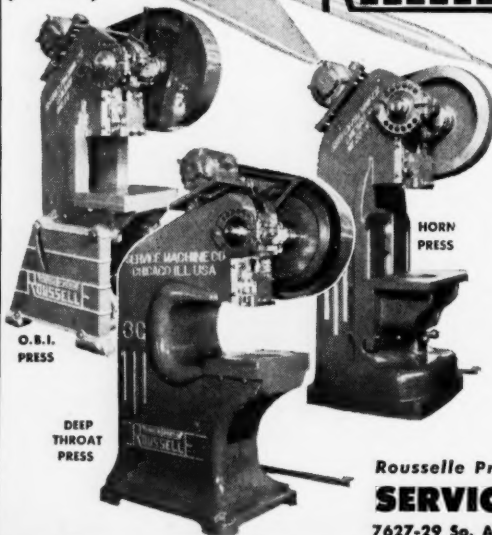
# ERICKSON TOOL COMPANY

## Metal-Working News in Brief

The Carborundum Co., Niagara Falls, N. Y., has announced several personnel changes. **George S. Rogers**, Buffalo district sales manager; **William T. O'Mara**, general salesman, Buffalo sales district; and **Samuel Phipps**, general salesman, St. Louis district, have retired after 37, 41, and 35 years of service, respectively. **George H. Dennison** has been made Buffalo district sales manager, and **William G. Kettner, Jr.**, has been promoted to office manager for the New York sales district. **C. R. Strong**, general salesman in the Chicago sales district, has been transferred to the Peoria, Illinois, territory. **F. H. Garske, Jr.**, **A. G. Ott**, and **J. H. Spehr** will service the Wis-

consin territory, formerly served by **Mr. Strong**. **M. I. Johnson**, formerly bonded field sales engineer in the Buffalo district, was made general salesman and will service the territory formerly covered by **Mr. O'Mara**. **G. A. Tanner**, graduate sales trainee, has been made general salesman and assigned to the St. Louis district. **H. A. Johnson**, coated abrasive salesman in the St. Louis district, has been assigned to cover the southern Texas area, formerly serviced by **S. E. H. France** who was transferred to the New York sales district. **H. W. McGarr**, coated abrasive salesman for the Des Moines-Davenport area, has been transferred to the Chicago district. The Des Moines-Davenport area will be served by **R. D. Hulben** and **Mr. Strong**.

*Men who had to "lick"  
the very problems you're  
facing designed...* **ROUSSELLE PRESSES**



That's why they're fast, accurate, so adaptable, so easy to operate. Why maintenance is simple. Why initial cost is low . . . Often considerable savings and improved punch press operations are possible if you let our engineering staff assist you. There is no obligation. Simply furnish the details relating to your need or problem and if possible send samples or drawings of the work. You will hear from us promptly.

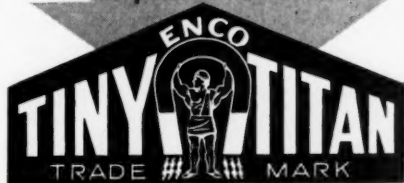
Sold Exclusively Through  
Leading Machinery Dealers

**Rousselle Presses are Manufactured by  
SERVICE MACHINE CO.  
7627-29 So. Ashland Ave., Chicago 20, Illinois**

# IMPORTANT ANNOUNCEMENT!

A COMPLETE LINE OF  
NEW, PRECISION  
MAGNETIC BASE  
TOOLS that  
surpass all others

- ★ MOUNTS TO CURVED OR FLAT SURFACES INSTANTLY!
- ★ New circuit develops the most powerful magnet for its size made.
- ★ Many new improvements permit any adjustment combination heretofore regarded as impossible.



**NEW!**

Invaluable precision adjustment.

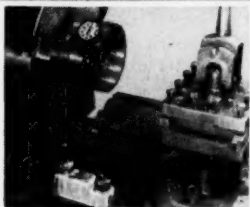
**NEW!**

Ball swivel and stem of non-magnetic material.

**NEW!**

Sure-grip non-breakable tenite plastic case 1 1/4" wide, 4" long and 1 1/2" high.

## TINY-TITAN No. 160



Model 160 being used to indicate workpiece on engine lathe.

**NEW!**

Knurled jack-type magnet release and positioning screw.

**NEW!**

Magnetic pull 25 lbs.

**NEW!**

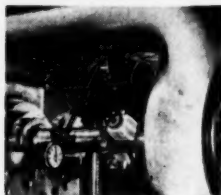
Fool proof adaptor allowing 360° adjustment in all directions.

**NEW!**

3-step universal rod for all indicators. Sizes 3/8", 1/2" and 5/8" diameters.

Offset clamp rod for lug back indicators.

## NEW, SUPERIOR TINY-TITAN No. 100



Model 100 being used to align fixture in production mill.

- Every indicating problem now easily solved.
- No more indiscriminate clamping.
- All materials and workmanship unconditionally guaranteed.

**NEW!**

3-step universal rod for all indicators. Sizes 3/8", 1/2" and 5/8" diameters.

**NEW!**

Ball swivel and stem of non-magnetic material.

**NEW!**

Sure-grip non-breakable tenite plastic case 1 1/4" wide, 1 1/8" long and 1 1/2" high.

**NEW!**

Fool proof adaptor allowing 360° adjustment in all directions.

**NEW!**

Magnetic pull 65 lbs.

**SEND NOW FOR BULLETIN No. 605** describing TINY-TITAN complete new line, including Models No. 120 (magnifier), 130 (precision adjustment indicator holder), 150, 200 (Handi-Lite), and 250 (magnetic base lighting unit).

ENCO MANUFACTURING COMPANY, Dept. 183

4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Order from your mill supply dealer or send order with name of your mill supply dealer

## Metal-Working News in Brief

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., has announced the appointment of **Michael M. Munson** as cutting tool sales engineer. In his new position, Mr. Munson will devote his time to customers' special application and engineering problems in the cutting tool line.

Firth Sterling Inc., Pittsburgh 30, Pa., has announced the establishment of a new Chicago district office and warehouse at 3415 North Ave., Melrose Park, Ill. **R. O. Valoon** has been appointed district manager of the Chicago district, replacing **E. A. Carpenter** who has resigned to establish his own business. The company has also announced the appointment of **Lester N. Shannon, Jr.**, as district manager

of its southern district located at 2308 Fourth Ave., N., Birmingham, Ala. Mr. Shannon succeeds **C. E. Hughes** who has resigned.

— o —

**Lloyd W. Jeffries** has been appointed general sales manager for both Valvair Corporation and its affiliate, The Sinclair - Collins Valve Company, both of Akron, Ohio. Mr. Jeffries succeeds **Kenneth E. Knotts** who has been named sales representative for Valvair in metropolitan New York and northern New Jersey. The **K. E. Knotts Company's** headquarters are located at 106 Miln St., Cranford 6, New Jersey.

**SAVE  
3  
WAYS  
WITH A  
LUCIFER  
ELECTRIC FURNACE**



**1** SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

**2** SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed—Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

**3** SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

### CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$467.00	\$548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

**WRITE FOR FREE** literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

## LUCIFER FURNACES, INC.

Neshaminy 10, Pa.

Phone Hatboro 0411

Successors to Gilbert S. Simonski Company

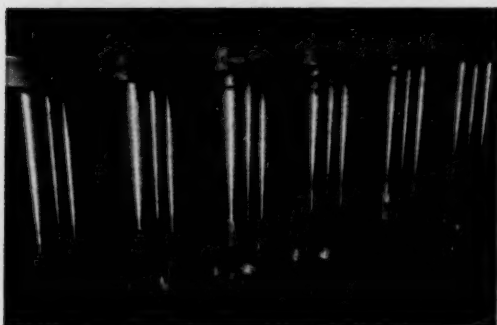
OUNCES  
OF



**WESSONMETAL**

CEMENTED CARBIDE!

**TONS OF PRODUCTION!**



**ACTUAL JOB**

**Farm Implement Mfg. Co.**

Machine.....Ingersoll Boring Mill—6 spindle  
Part.....Cylinder block  
Operation.....Rough cylinder bore  
Tools.....3 R.H. and 3 L.H. Wesson Fine  
Pitch Cutters—3.480 dia.—  
12 Wessonmetal Solid Gt Blades  
Speed.....148 S.F.M.  
Stock Removal...3/16"  
Feed......10" per min.—.063 per revolution  
Length of Cut...8 1/4"

**OVER 300% DOLLAR SAVINGS PER TOOL**

**OLD METHOD**

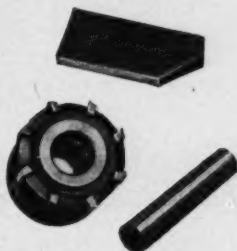
Pieces per Grind.....836  
Cost of Tool.....\$49.68  
Grinding Cost  
per sharpening.....\$11.70  
Tool Cost per 100 Pieces..\$2.588

**NEW WESSON METHOD**

Pieces per Grind.....3160  
Cost of Tool.....\$172.80  
Grinding Cost  
per Sharpening.....\$8.78  
Tool Cost per 100 Pieces..\$0.642

On only one machine with Wesson Tools Savings of over \$900 per year

**HOW IS YOUR PRODUCTION SCORE CARD!**



Write today for folder  
on Wesson's  
educational, full color,  
sound movie—  
"This Carbide Age."

**WESSONMETAL**  
Cemented Carbide

**WESSON METAL CORPORATION**

LEXINGTON, KENTUCKY

Affiliated with WESSON COMPANY, Detroit, Mich.



## Metal-Working News in Brief

Mid-West Abrasive Company has announced the election of **A. C. Reppenhagen** as president and general manager. **L. P. Jackson** will continue as chairman of the board. Mr. Reppenhagen joined the company in 1944 and was formerly employed as general manager of the Experimental Tool & Die Company.

Four new vice presidents have been elected by the directors of Thor Power Tool Co., Aurora, Ill. **J. A. Hill**, associated with the firm for 33 years, has been elected vice president and sales manager. **John A. McGuire** retains his present title of chairman of the executive committee and, in addition, becomes vice president in charge of labor relations. **B. H. Johns**, who headed the company's branches in St. Louis and

Philadelphia and was sales manager of the Contracting and Mining Division, has been named vice president in charge of rock drill sales. **W. B. Hunn**, who has served Thor for 18 years, has been elected vice president in charge of its Los Angeles works.

— o —

**Anderson Bros. Mfg. Co.**, Rockford, Ill., has announced the election of **Walter E. Gunnerson** as vice president in charge of sales. Mr. Gunnerson has been associated with the company for 27 years, and, in the past 15 years, has served as sales manager and chief engineer.

*your best buy in  
modern milling machines:*

**GREAVES  
NO.2-H**



Plain or Universal

• Offers every modern milling machine advantage:

18 spindle speeds 25 to 1250 rpm,  
18 feeds  $\frac{1}{16}$ " to 30" per minute, rapid  
traverse, Timken bearings and  
many others.

You can't buy a better combination  
of simplicity, rugged construction,  
ease of operation, accuracy and  
production speed.

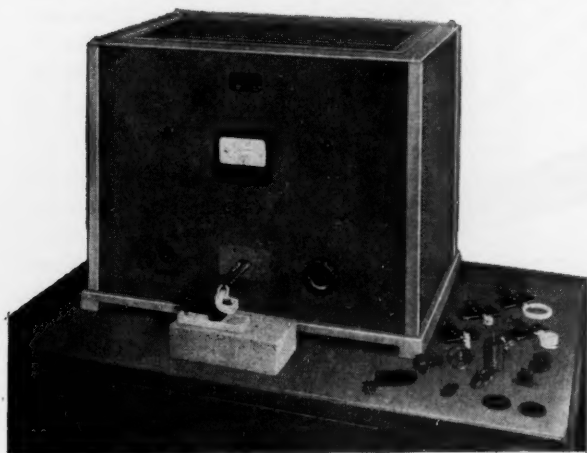
Send for bulletin and price list.

**GREAVES**

THE GREAVES MACHINE TOOL CO.

2700 Eastern Avenue, Cincinnati 2, Ohio

**Lepel** presents  
**A Low Cost PORTABLE  
 HIGH FREQUENCY  
 Induction  
 HEATING UNIT**



• **SMALL AND COMPACT**

Conveniently operated on bench or table—no mounting necessary.

• **ECONOMICAL OPERATION**

No special power installation required. Operates on 110 volts, 60 or 50 cycle line at unity power factor.

• **FULLY GUARANTEED**

Guaranteed for continuous duty cycle and stated performance.

This versatile unit is priced so low that every shop may now take advantage of modern induction heating techniques to improve quality and to increase production. Its simplicity of operation eliminates the need for skilled personnel.

The Lepel Model 2 KW will meet the requirements of machine shops, toolrooms, research laboratories and educational institutions. It is especially suitable for hardening, brazing and soldering small parts of either ferrous or non-ferrous metals.

**WILL HEAT TO 1500° F.**

$\frac{1}{8}$ " steel rod 1" length in approx.	1 second
$\frac{1}{8}$ " " " " " " " " " " "	3 seconds
$\frac{1}{8}$ " " " " " " " " " " "	15 seconds
$\frac{1}{8}$ " " " " " " " " " " "	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes.  
 Equally well suited for heating of non-ferrous metals.



**BRAZING**

Permits widest choice of alloy or copper brazing alloys from lowest to highest melting points. Ideal for brazing outside tips.



**HARDENING**

Heat localized exactly where wanted at desired temperature. Ideal for gears, cams, bearing surfaces, cutting tools and other areas that are subject to wear.



**SOLDERING**

Speedily and neatly performs intricate soldering applications with or without the use of pre-formed tags.



**ANNEALING**

Ideal for annealing, stress-relieving, normalizing or pre-heating selected areas.



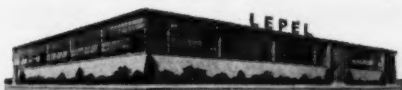
**MELTING**

Readily melts quantities of ferrous and non-ferrous metals in either granular or cast form.

Complete unit with line connection and load coil.

**\$870.**

f.o.b. factory



**LEPEL HIGH FREQUENCY LABORATORIES, INC.**

55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission  
 Write for Lepel Catalog MMS-8

August, 1953

MODERN MACHINE SHOP 259

## Metal-Working News in Brief

Honan-Crane Corp., Lebanon, Ind., has announced the appointment of **Francis D. Skelley** as sales engineer for the State of New Jersey. Mr. Skelley, formerly sales manager of Standard Electronics Research Corp., New York, will operate out of Honan-Crane's district warehouse in Ridgefield, New Jersey.

Five experienced production engineers have been appointed to represent the Shear-Speed Chemical Products Division of Michigan Tool Co., Detroit, Mich., in midwestern areas. The representatives and their areas are **E. W. Brock**, 5657 Montgomery Rd., Cincinnati 13, Ohio, southern Ohio and Kentucky; **H. O. Monohan**, 1007 Yale Ave., St. Louis 17, Mo., southern Illinois, Missouri, and eastern Kansas;

**C. B. Parsons Co.**, 739 N. Broadway Ave., Milwaukee 2, Wis., Wisconsin; **Polhemus-Miller Co.**, 9 S. Kedzie Ave., Chicago 12, Ill., northern Illinois and eastern Iowa; and **D. C. Wedlick**, 401 Willow Lane, Muncie, Ind., east-central Indiana.

— o —

**Gordon W. Smithson** has been promoted to the position of chief engineer of Potter & Johnston Co., Pawtucket, R. I. In his new position, Mr. Smithson will direct all product improvement and engineering and research, both mechanical and electrical, on the company's machine tools.

**try it**

**eye it**

**buy it**

**NEW LINE!**  
**CHISELS & PUNCHES**  
**by BILLINGS**

**PUNCHES** . . . Pin - Center - Solid - Prick - Long Taper - Extra Long Pin! Six Styles in thirty four Point Sizes!

**COLD CHISELS** . . . Long and short - fat and thin! Cutting edges ranging from  $\frac{1}{8}$ " to 1"! Lengths from  $4\frac{1}{2}$ " to 18"!

Tough, dependable tools forged from octagon tool steel to our most rigid specs! Hardened and tempered to give 'em extra strength, safety and a long life.

You know they can take it! You know they're top quality because each one is marked with "BILLINGS"

BUY 'EM FROM YOUR BILLINGS INDUSTRIAL DISTRIBUTOR!

**BILLINGS**

THE BILLINGS & SPENCER CO.  
HARTFORD 1, CONN., U.S.A.  
QUALITY TOOLS AND FORGINGS SINCE 1869



Economy points to  
**Bay State Taps**

...on nearby shelves of  
industrial supply distributors.

**BAY STATE TAP & DIE COMPANY • MANSFIELD, MASS.**

August, 1953

MODERN MACHINE SHOP 261

## Metal-Working News in Brief

The appointment of **Metals Finishing Corp.**, 836 E. Tenmile Rd., Hazel Park, Mich., as distributor for the "Honite" line of barrel finishing products has been announced by Minnesota Mining & Mfg. Co., St. Paul, Minn. The firm will serve the adjacent areas of Ohio and Indiana, as well as the State of Michigan.

**E. C. Clark**, assistant director of the Research and Engineering Department, has been appointed director of operations, Air Reduction Sales Co., New York 17, N. Y. **L. B. Dobbins**, works manager of Aircor's liquid oxygen plant at Butler, Pa., has been appointed manager of plant engineering in New York, replacing **R. E. Lenhard** who is being transferred to the Ohio Chemical and Surgical Division of Air

Reduction, Madison, Wis., as vice president of manufacturing.

— o —

The Bellows Co., Akron, Ohio, has announced the appointment of four field engineers to service territories with the following headquarters: **Michael J. Vancheri**, 727 Penn Ave., Wilkinsburg 21, Pa.; **Thomas J. Garfield**, 69 Lincoln Park, Newark 2, N. J.; **William Hultgren**, 70 E. 45th St., New York 17, N. Y.; and **Daniel J. Rowan**, 183 Hartford Ave., Providence 9, R. I. The men will handle the complete line of Bellows "Controlled-Air-Power" devices.



**NOW! JIFFY  TIRES**

**STANDARD EQUIPMENT ON**

**GROB**  
BAND SAWS

**Proof of Acceptance is that this manufacturer has joined the ranks of leading band saw manufacturers using CARTER Jiffy Tires as standard equipment because**

- Jiffy Tires can be changed in 10 minutes
- Provide 2 to 4 times more wear
- Provide perfect traction and balance
- Jiffy Tires are safe . . . won't throw at any speed

**GROB BROS.**  
Grafton, Wisc.  
24 1/2" Band Saw

**Available only thru Band Saw Manufacturers**

**CARTER PRODUCTS COMPANY, INC.**

**426 Wm. Alden Smith Bldg. 30 Ionia Ave., S. W.**  
**Grand Rapids 2, Michigan**

It takes only a **Jiffy**  
to pack it right...  
to ship it fast...



Whether you ship  
spare parts, tools,  
accessories, precision  
instruments or other products  
of semi-fragile or non-fragile  
nature—you need only JIFFY  
PADDED SHIPPING BAGS for complete packing protection.

Consider the savings effected in using JIFFY PADDED SHIPPING BAGS.

**Time and Labor**—the entire packing operation is reduced to 3  
simple steps.

Insert item—Fold along scored line—Staple or Tape.  
**SAVE UP TO 76% IN PACKING TIME!**

**Packing Material Costs**—stock JIFFY BAGS and eliminate  
the need for corrugated boxes, fillers, overwraps  
and twine. JIFFY's built-in expansion cushioning  
hugs contents tight, absorbs shocks in  
transit. Its patented construction prevents damage  
due to moisture, dirt or dust.

Available in 8 standard sizes.

**Free samples on request.**

Distributors in 43 principal cities.

Jiffy Bags meet Military Spec-  
ification MIL-B-4604 (USAF).


**JIFFY MANUFACTURING COMPANY**

FLORENCE AVENUE ★ HILLSIDE, NEW JERSEY





Zagar 1" collet holding fixture cuts costs in center drilling shafts.

take a short cut-  
depend upon  
**Zagar**-  
holding and   
indexing fixtures  
for milling, drilling,  
tapping and grinding

"Skip" the many special set-ups, jigs and fixtures formerly needed to hold and index. Maintain accuracy and close tolerances. No vertical movement in closing. Stop insures exact duplication of parts. Pipe tap hole provides for lubrication of cutting tools and washes out chips. Index any number of positions from 2 to 25 (4, 6 and 8 divisions standard). 1" and 2" sizes.

Write for Manual S-8.

**ZAGAR TOOL, Inc., 24000 Lakeland Blvd.**

**Zagar** TOOLS For  
INDUSTRY  
and SPECIAL MACHINERY

Cleveland 23. O

## Metal-Working News in Brief

The Fulflo Specialties Co., Blanchester, Ohio, has announced the appointment of the following representatives: **Lewis Pump Co.**, Philadelphia, Pa.; **Truman E. Longley Co.**, Cleveland, Ohio; **Pump Engineering Co.**, Los Angeles, Calif.; **Wooden & Little**, San Francisco, Calif.; **Robert Taylor & Sons**, Salt Lake City, Utah; **Rogers & Baxter**, St. Louis, Mo.; and **R. MacLeay & Co., Ltd.**, Montreal, Canada.

— o —

Adamas Carbide Corp., Harrison, N. J., manufacturer of standard carbide tools, tool tips, dies, and wear parts, has announced the appointment of **Raymond J. Nagy**, Simsbury, Conn., as its sales representative for the State of Connecticut.

— o —

Three stocking distributors to locally handle its tools in the midwestern area have been appointed by Scully-Jones & Co., Chicago, Ill. The distributors are **Walter R. Hammond Co.**, 1419 Washington Ave., S., Minneapolis, Minn.; **Precision Tool Sales**, 101 W. Archer, Tulsa, Okla.; and **Eichman Machinery Co., Inc.**, 1701-3 Locust St., Kansas City, Missouri.

— o —

The appointment of **William R. Holmes** as district manager of the Cleveland district and **Joseph J. Codd** as Baltimore district manager has been announced by United States Steel Supply Division of U. S. Steel Corp., Chicago, Ill. **William G. Thornton** has been named office manager in Baltimore, succeeding Mr. Codd. Mr. Holmes succeeds **Edwin J. Heffner** in the Cleveland district who will remain with the company in a consulting capacity.

DRILLING

MILLING

GRINDING

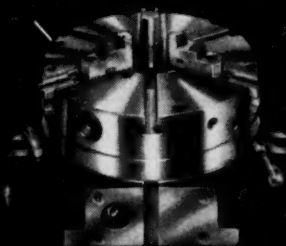
BORING

**SUPER-SPACERS**

PLANING

**VERSATILE**

SLOTING



**HARTFORD**  
*Special*

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

### Metal-Working News in Brief

Utica Drop Forge & Tool Corp., Utica, N. Y., has announced the appointment of **Ronald A. Larsen**, Houston, Texas, as manufacturers representative for the complete line of Utica pliers, adjustable wrenches, and screw drivers. Mr. Larsen and his organization will cover southern Texas and Louisiana.

— o —

**Gordon E. Medlock**, formerly assistant sales manager, has been appointed sales manager of **Stearns Magnetic Inc.**, Milwaukee, Wis. Associated with the company since 1946, Mr. Medlock will be responsible for the sales of the firm's complete line of magnetic separation and power transmission equipment.

**Pearce Tool & Gauge Co.**, Chicago, Ill., has been appointed representative for Schauer speed lathes. Pearce will represent Schauer in northern Illinois, Wisconsin, eastern Iowa, and northern Indiana.

— o —

Carboloy Department of General Electric Co., Detroit 32, Mich., has announced the appointment of **Grant A. Morrison** as representative in the mid-western district. Mr. Morrison's headquarters will be located at 3907 S. Madison, Tulsa, Okla. The company has also announced the appointment of **Richard J. Benefiel** as salesman, assigned to the Pacific district office in Huntington Park, California. Mr. Benefiel will cover the San Francisco and northern California, Oregon, and Washington areas.



## **STOP** the major cause of **TAP BREAKAGE**

increase tap life 5 to 10 times  
with **TAP-CARTRIDGES**

Drop TAP-CARTRIDGE into drilled hole; tap hole through cartridge; chips are imbedded in wax and forced out of hole. Tap is protected every thread of the way.

- very economical
- saves time and labor
- eliminates torn threads
- no cleaning-out operation required
- facilitates thread-cutting to bottom of hole
- available for tap sizes from No. 2 up and for any depth of drilled hole



For full details write to the . . .  
**TAP-CARTRIDGE CO.**  
1638 CENTRAL PARKWAY  
CINCINNATI 10, OHIO

### Metal-Working News in Brief

**Harold E. Russell**, assistant sales manager, Industrial Sales Division, A. Schrader's Son, Division of Scovill Mfg. Co., Inc., Brooklyn, N. Y., died recently. Mr. Russell had served the company for over 16 years.

— o —

Norton Co., Worcester, Mass., has announced the retirement of **Robert L. Schwaegerle**, abrasive engineer in the eastern Iowa territory. Associated with the company for 25 years, Mr. Schwaegerle has been succeeded by **Robert H. Johnson** who has been associated with the company since 1941.

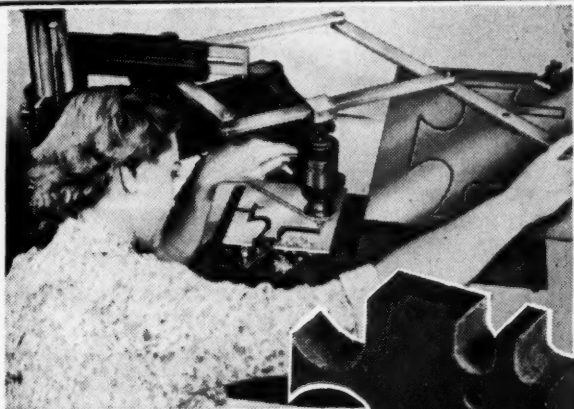
— o —

**Thor Power Tool Co.**, Aurora, Ill., has announced that it will open a sales and service factory branch office in Atlanta, Georgia, on October 1, 1953. The Atlanta office, scheduled to occupy quarters in a building under construction at 1363 Spring Street, will serve distributors and tool users in the states of Georgia, South Carolina, and Florida.

**Scully-Jones & Company** has moved its Detroit office from 2832 E. Grand Boulevard to 19372 James Couzens Highway, Detroit 35, Michigan.

— o —

Niagara Machine & Tool Works, Buffalo, N. Y., has announced that **J. H. Horton** has rejoined its sales staff after serving in the armed forces. Mr. Horton will work out of the Philadelphia district office located in Wynnewood, Pennsylvania.



## PANTOGRAPHIC PROFILING ON METALS AND PLASTICS

rapidly done by unskilled labor with

*new hermes*

**Engravo**  
*graph*

Write for literature

Bench Type Model H-27 (weight 200 lbs.)

Portable Model IM also available

**NEW HERMES, INC.** 13-19 University Place, N. Y. 3

Representatives in all principal cities. Canada—359 St. James St., Montreal



Radius  
Forming  
Tools



"Tru-Line"  
Profile  
Dressing  
Tools



Diamond  
Grit Tools  
for Thread  
Dressing



"Tru-Thread"  
Thread  
Dressing  
Tools



# "Bloomin Idol made o' mud— wot they called the Great Gawd Budd"

—KIPLING

The two French soldiers crouched and watched the white little beam of Indian sunlight creep into the eye of the great gilded image across the shadowy chamber. Suddenly, the eye blazed and flashed with brilliant, jewelled fires.

"Diamantes!" they whispered, and rushed over and clambered up to the great face. A few moments later they ran out into the turmoil and gunfire in the streets and fled with the rest of the French soldiery, retreating before Captain Clive's victorious Sepoys.

A diamond as big as a walnut and weighing 200 carats isn't the easiest thing to trade, but, eventually, it reached an Armenian dealer who sold it to the Russian Count Orloff for \$560,000. The Count diplomatically presented it to the Empress Catherine, who was so pleased that she gave him a half-million dollar grant and another title.

After 200 years, the Orloff Diamond is still one of the world's great jewels. Probably it came from the fabled diamond fields of Golconda which supplied ancient Indian craftsmen with diamonds for their metal-working tools.

And, today, as then, diamonds are still the world's greatest cutting element, prized by industry because they so effectively increase production and reduce costs.

For 43 years we have specialized in importing fine industrial diamonds for American industry and manufacturing standard and special diamond tools—engineered to your job and guaranteed to do it. Our field engineers are at your service.

## **WHEEL TRUEING TOOL COMPANY** **23-3200 West Davison Avenue Detroit 6, Michigan**

ESTABLISHED 1910

*Offices in Principal U. S. Cities—Agents Throughout the World*

**WHEEL TRUEING TOOL COMPANY OF NEW JERSEY**

33 West Street, Bloomfield, N. J.

**WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.**

575 Langlois Ave., Windsor, Ont.





### Metal-Working News in Brief

Firth Sterling, Inc., Pittsburgh 30, Pa., has announced the appointment of **James E. Gray** as assistant manager of carbide sales and **Stuart A. Smith** as Ohio district manager, replacing **Macon Jordan** who has resigned. Mr. Gray was supervisor of carbide sales in the Chicago district; Mr. Jordan a salesman in the Ohio district.

The opening of a new sales and service factory branch office in Newark, New Jersey, has been announced by **Thor Power Tool Co.**, Aurora, Ill. The new office, located at 1 Tichenor Lane and Parkhurst Street, is completely equipped to offer Thor distributors and tool users in northern New Jersey factory branch repair service and sales engineering assistance on Thor's line of air and electric power tools.

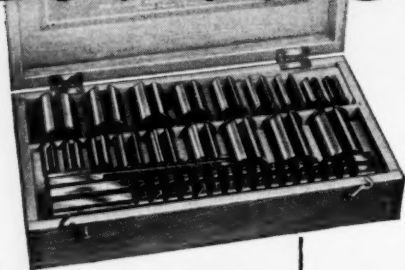
— o —

**George C. Montague**, Norton Company's first grinding machine salesman, died recently at the age of 86. Mr. Montague had been selling Norton grinding wheels and grinding machines since 1898 until his retirement from the company in 1936.

— o —

The Bellows Co., Akron, Ohio, has appointed **William E. Storey**, The Bellows Co., 600 16th St., Oakland, Calif., and **Ernest Ritchie**, The Bellows Co., 400 E & C Bldg., 17th St., Denver 2, Colo., to handle the complete line of Bellows "Controlled - Air - Power" devices.

# KEYWAYS?



**CUT 'EM EASY**—by hand, arbor press

**CUT 'EM QUICK** — one minute per keyway

**CUT 'EM CHEAP** — as little as a penny apiece

(25 standard Kits; 23 standard sizes of broaches; 71 standard size bushings; and a wide variety of production type, guideless broaches)

## with du MONT *Minute Man* KEYWAY BROACH KITS

**CUT AND MAIL THIS COUPON TO**

The du MONT CORPORATION, Greenfield, Mass.

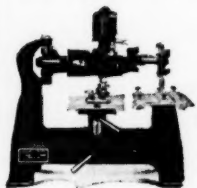
MAIL ME FREE CATALOG and PRICE LIST S

Name .....

Company .....

Address .....

# Engrave



ON  
**STEEL**  
other  
metals  
and plastics

The PREIS-PANTO Model UE and UE-3 Machines are high precision constructed and sturdy for accurate work on all materials. Widely adaptable to engraving, etching, electric and diamond marking of tools, parts and products.

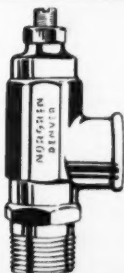
Write for UE and UE-3 Color Brochure & prices.

**PANTO**

**H. P. PREIS ENGRAVING MACHINE CO.**  
657 U. S. Route 22, Hillside, N. J.

# relief valves

for  
**AIR-  
WATER-  
OIL-  
GASES-**



1/8"  
to  
1"

**automatic  
holds setting  
positive relief**

WRITE FOR CATALOG

**Norgren®**  
C. A. CO. 

3435 So. Elati St., Englewood  
In Colorful Colorado  
Valves • Filters • Regulators  
Lubricators • Hose Assemblies

## Punches Shaped from the SOLID with OTTMANN Punch Shaper



### FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.

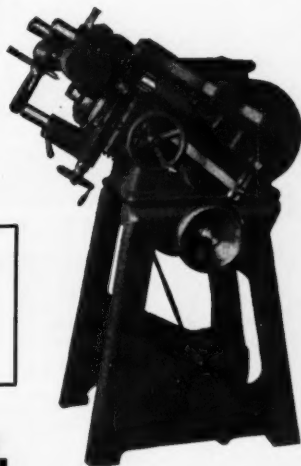


Write for Literature

**CEDAR-WEST TOOL CO., INC.**

90 WEST ST.

NEW YORK 6, N. Y.



## Metal-Working News in Brief

Delta Power Tool Division of Rockwell Mfg. Co., Pittsburgh, Pa., has announced the establishment of a new regional distribution setup involving the appointment of four regional managers; namely, **Byron Coon**, Oakland, Calif., western division; **George H. Madeska**, Chicago, Ill., central division; **Walter H. Redpath**, Toronto,

Ont., Canadian division; and **George E. Rockwell**, New York City, eastern division.

— o —

**Nick S. Deanovich** has been named Texas representative of Gisholt Machine Co., Madison 10, Wis. Associated with the company for almost 15 years, Mr. Deanovich will make his headquarters at 4101 San Jacinto, Houston, Texas.

— o —

**Norton Co., Worcester 6, Mass.**, has announced the appointment of **Charles R. Van Riper** as district sales engineer for the Chicago district. Mr. Van Riper will organize and direct field engineering activities in Chicago, reporting to **Raymond E. Taylor**, district manager.

— o —

**Columbia Tool Steel Co., Chicago Heights, Ill.**, has announced the appointment of **H. Wilson Ryno** as its sales representative in the New Jersey and New York district. Mr. Ryno will be located at 1060 Broad St., Newark, N. J.

# SHIMS

nearly  
always  
come  
from

SHIM  
HEADQUARTERS  
SINCE  
1913



SEND  
FOR  
LITERATURE

UNION STREET • GLENBROOK, CONNECTICUT

Specialists in Designing and Producing Carbide Cutting Tools

WESSON'S

NEW

HEAVY-DUTY

# HUSKI-CUT

## FINGER GRIP HOLDER

SHORTER CLAMPING GIVES  
AVERAGE OF 70% MORE  
TIP REGRINDING!



*Compare these Features!*

- Use Heavier Feeds — Higher Speeds on heavy-duty and extra-heavy-duty jobs.
- Fine thread screw adjustment is fast, positive and minute — far less than 1/16" required where serrations are involved.
- Simple design — only 5 parts. H.S. Steel Anvil replaceable at low cost. No exposed clamps to wear. Use only 1 wrench all adjustments.
- Broached insert hole. Insert changeable without removing holder from machine.
- Solid Wessonmetal cemented carbide insert semi-standard with formed clearance angles. No slotted carbide to crack. No brazing of tips. Length of cutting edge constant.
- Offset Holder provides generous chip clearance.
- Tested and proven on production lines.

WESSON COMPANY 1220 Woodward Heights Boulevard  
FERNDALE (DETROIT 20) MICHIGAN

Affiliated with WESSON METAL CORPORATION, Lexington 34, Kentucky

WRITE  
for  
BULLETIN  
521  
TODAY

## Metal-Working News in Brief

The Lima Electric Motor Co., Lima, Ohio, has announced the appointment of **Thomas F. Sears**, of Bellaire, Texas, as factory motor distributor, servicing manufacturers in Texas and Louisiana.

— o —

**James A. Moody** has been appointed district sales representative in the Philadelphia area for C. A. Norgren

Co., Englewood, Colo. With headquarters at 114 N. Wayne Ave., Wayne, Pa., Mr. Moody will cover southeastern Pennsylvania, southern New Jersey, and Delaware.

— o —

**Waldes Kohinoor, Inc.**, Long Island City, N. Y., has announced the appointment of **Leonard A. Kirsch** as assistant to **Joseph Bloom**, advertising manager of the company. In his new position,

Mr. Kirsch will be concerned with publicity and public relations.

— o —

**Kenneth C. Spooner**, sales manager, has been named vice president of **Simmons Machine Tool Corp.**, Albany, N. Y. Mr. Spooner has been associated with the company for more than 15 years.

— o —

**Sumner Simpson**, board chairman of Raybestos - Manhattan, Inc., died recently at the age of 79. Mr. Simpson was Raybestos-Manhattan's only president until a few years ago when he became chairman of the board.

**WHY is it 4-to-1\***  
**for IDEAL LIVE**  
**CENTERS?**

★ Named "Leading Brand" 4-to-1 over any other in a nation-wide survey of industrial distributors.



Multi-Duty Model

for  
**BIG**  
or **LITTLE**  
**TURNING JOBS**

**THE** answer lies in their micrometer accuracy and bulldozer durability. Unique construction, short overhang and precision-type bearings insure utmost rigidity and accuracy. All parts are hardened and ground. Special seals keep out chips, coolant and other foreign matter. It's this built-in performance that makes them a 4-to-1 favorite.

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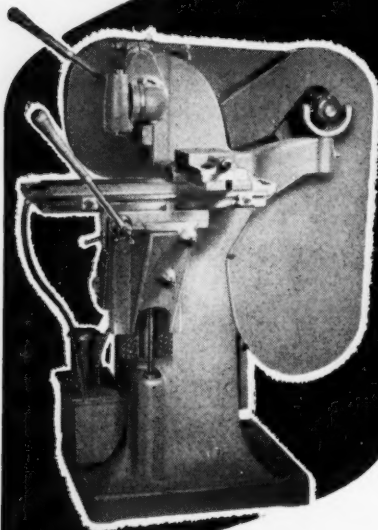
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## Book reviews

**Boron Steel.** Second Revised Edition.  
Edited by Ernest E. Thum. Published  
by American Society for Metals, 7301  
Euclid Ave., Cleveland 3, Ohio. 111  
pages. Illustrated. Paper covers. Price,  
\$1.00.

This booklet is comprised of a number of articles and panel discussions on the subject of boron steels. Opening with an editorial entitled "It's Later Than You Think," the booklet presents a series of four articles on the following topics: Saving Precious Alloys by Intelligent Use of Alternatives; Necessity for Further Conservation of Alloys in Steels; Boron Steels (by panel on conservation); and Special Carburizing Steels, Boron Treated.

Next, seven articles are presented which provide a record of experience with boron steels. Titles are Recent Experiences with Boron Steels in Production; Use of Boron Steel in Production of Hand Tools; Caterpillar Tractor Company's Experience with Boron Steels; Forgeability, Machinability, and Hardenability of Boron Carburizing Steels; Distortion and Service Tests of Carburized Gears Made of Boron Steels; Processing of Boron Steels in the Shop; and Boron Steel in Through Hardened Parts for Truck Axles. The effect of boron on steel is covered by two articles headed Summary of Laboratory Investigations and Medium - Carbon Boron - Treated Steels. Finally, the booklet includes a supplement on hardenability test, H-steels, and their use.



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**Simplified Drafting Practice.** By William L. Healy and Arthur H. Rau. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 156 pages. Illustrated. Cloth binding, board covers. Price, \$5.00.

This is not a textbook on engineering drafting. Rather, its purpose is to arouse the interest of engineering and drafting organizations everywhere in the substantial savings in time and money that can be attained by the adoption and extension of simplified practices. The book shows in many instances, ways and means of reducing the time and effort required to make complete, concise, and accurate drawings. Chapter headings of the volume include simplification, eliminating unnecessary work, freehand drawing, the use of symbols, mechanical aids, abbreviations, arrowless dimensioning,

examples of simplified drafting, legible lettering, tolerances, use of instructions, drawing forms and related routines, and reproduction processes.

**Bibliography of Resistance Welding** (Bulletin No. 17). Compiled by E. J. Del Vecchio. Published by Resistance Welder Manufacturers Association, 1900 Arch St., Philadelphia 3, Pa. Paper covers. Price, \$1.25.

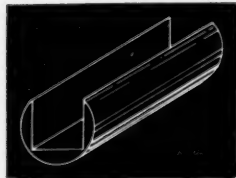
This bibliography has been prepared to present as nearly as possible a complete and accurate record of published technical articles on all phases of resistance welding within the past few years. The list includes only those articles which have been published in the United States starting with 1946. However, some articles before that are included because of their continued value and importance.

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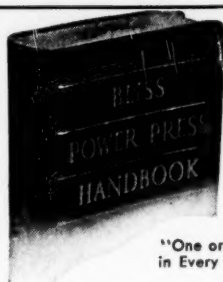
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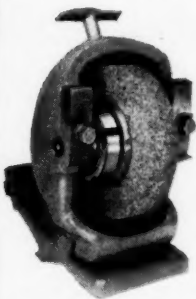
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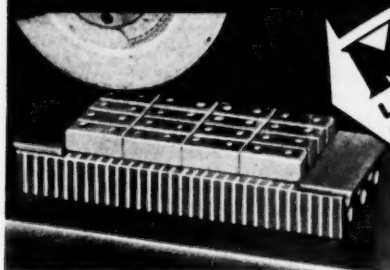
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**Mechanical Inspection.** By W. H. Armstrong. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. 361 pages. Illustrated. Cloth binding, board covers. Price, \$5.50.

This book is designed to train inexperienced men and women as inspectors in machine shops or other related industries. Compiled primarily for use in class work of technical institutes, vocational industrial schools, or industrial training programs, the volume is also sufficiently detailed for self-instruction. The major emphasis of the book is on descriptions of tools which are used for dimensional inspection of machine shop products, and explanations of methods used by inspectors. Outside of this general plan of organization, there are treatments of hardness testing, magnaflux and radiographic inspection, and statistical quality control.

Unity and integration are gained in the inclusion of all topics necessary to the inspector, including information about blueprint reading, the shop mathematics of inspection, inspection discussions (including the relationship between mechanical inspection and statistical quality control), surveys of non-precision and measuring tools used by inspectors, and instruction in the use and care of instruments. The mathematics necessary to the performance of various inspection operations is presented with the description of those operations. For further clarity and as a definite aid to student and instructor, blueprint reading problems and suggested questions are included at the ends of chapters; and for further help, a suggested laboratory problem and worksheet is provided at the end of the text.

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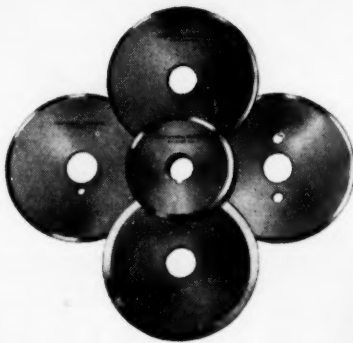
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**Tool Engineers' Data Book.** By Gerhard J. Gruen. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 219 pages. Cloth binding, board covers. Price, \$5.50.

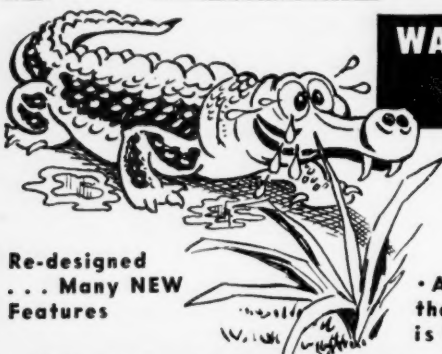
Designed for tool engineers and designers, this book contains complete data on the general properties of special alloys; heat treatment of special alloys and stainless steels; spot identification of metals, alloys, and plastics; blank size diameters for shells; and a vast amount of other hard-to-find or extremely recent information. Also included in separate sections are conversion tables, mathematical tables, and an extensive glossary of metallurgical terms. The book provides easy access to all of the tables, formulas, constants, and specifications needed by the practicing tool engineer and designer.

All explanations of theoretical con-

cepts and other text matter have been omitted, as have obsolete material and tabular material not directly related to the work of the tool engineer.

**Industry Enters the Atomic Age** (Manufacturing Series No. 210). Published by American Management Association, 330 W. 42nd St., New York 36, N. Y. 31 pages. Heavy paper covers. Price, \$1.25.

This booklet comprises papers which were presented at the Spring Manufacturing Conference of the American Management Association held at The Hotel Statler, New York, April 8-10, 1953. Titles of the papers are "The Atomic Energy Industry: A Status Report," "The Use of Radioisotopes in Manufacturing Operations," "The Place of the Manufacturer in Atomic Energy," and "The Meaning of Atomic Energy to Industry."



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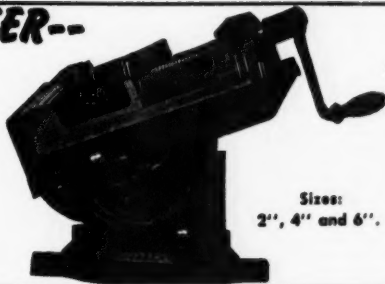
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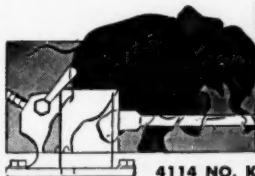
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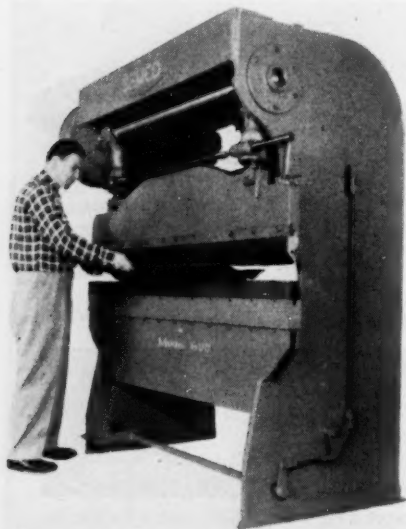
## new shop equipment

### Sheet Metal Forming Power Press Brake Features Normalized Ram and Frame

Service Machine Co., 402 Miller St., Elizabeth 4, N. J., has added to its Semco line a sheet metal forming power press brake which is available in 6 and 8-foot sizes, designated as the Models 600 and 800, respectively. The brake features an accurate ram and welded steel frame, both of which are normalized. Steel adjusting screws,

with buttress thread, and revolving alloy bronze nuts which are designed so as not to jam are incorporated in the machine. Precision adjustment of the ram (one complete revolution of the operator handle adjusts only 0.008 inch) is said to be afforded, and the balanced case-steel flywheel runs on ball bearings.

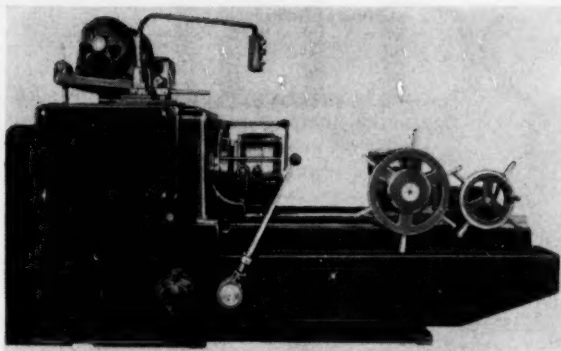
A die area of 12-inch shut height, with 3-inch stroke and 4½-inch adjustment of stroke, is said to be provided. A variable range of 16 to 40 strokes per minute is claimed to be obtained by means of handwheel adjustment.



### Threading Machine Is Intended for Heavy-Duty Precision Threading

Landis Machine Co., Waynesboro, Pa., has developed a threading machine for heavy-duty precision threading on large diameter work. Designated as the "Landmaco," the machine is built in a single-spindle model and can be furnished either with or without a lead screw attachment. The machine is designed to cut bolt threads from 1½ to 6⅝ inches in diameter and pipe threads from 1 to 6 inches in diameter, up to

Semco Model 600 Sheet Metal Forming Power Press Brake in use



**"Landmaco" Heavy-Duty  
Threading Machine**

29 inches long with lead screw and 30 inches without lead screw. Pitch capacity ranges from 2 to 24 threads per inch.

The bed of the machine is equipped with hardened and ground rectangular ways for guiding and supporting the carriage, which is of heavy-duty design and gibbed to provide wear compensation. It is operated by a hand-wheel in connection with a rack and pinion. The carriage front or vise is of a new design principle which assures proper work alignment under pressure.

A single gearshift lever is provided for a rapid speed change of 25 per cent for any given spindle speed as determined by the speed change gears in use. Three pairs of speed change gears provide 12 spindle speeds ranging from 9 to 152 r.p.m. The machine can be equipped with either a 4-inch standard rotary head or the new 6-inch (6-chaser) Lanco head.

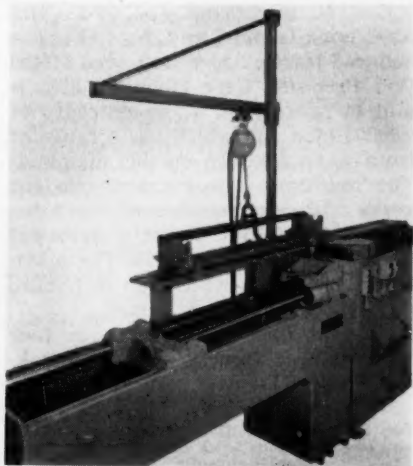
### **Traveling Broach Rack with Hoist for Heavy Broaches**

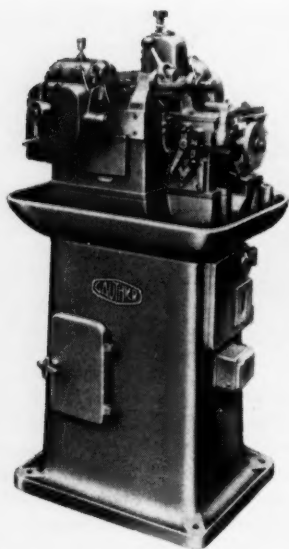
For use on broaching jobs requiring the handling of several heavy broaches,

Illustration showing Colonial broaching machine equipped with traveling broach rack and hoist

ed and where it is not feasible to remove the part between passes, a shuttle rack which is roller mounted is connected with the broach ram. As the ram moves, the rack moves with it.

When the broaching pass is finished, the rack is immediately above the broach to be removed. The broach is hoisted to the rack by first swinging the crane arm into position. Then padded hooks on the hoist pick up the heavy broach and place it in the rack. The ram returns to loading position with the rack following. The crane then swings around to pick up the next





broach from the rack and lowers it into the broaching position. The broach is attached to the puller for the next pass.

### **Improved Gear Hobber Holds Concentricity of 0.00008 Inch**

Eric R. Bachmann Co., 27-11 41st Ave., Long Island City 1, N. Y., has announced the Gauthier Improved Model W-1 Precision Gear Hobber which is said to operate on a concentricity of 0.00008 inch and which has a range of from  $\frac{1}{8}$  to 2 $\frac{3}{8}$ -inch outside diameter. The machine, it is claimed, can cut gears with any number of teeth between 6 and 230 and with a diametral pitch from 32 down to 170. The maximum gear width which can be hobbled on the machine is 1 $\frac{1}{8}$  inches.

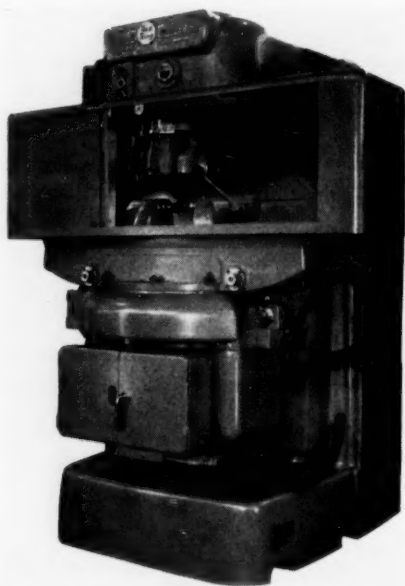
The machine is available in four basic setups; namely, manual chuck-

### **Gauthier Improved Model W-1 Precision Gear Hobber**

ing of gears and pinions with full automatic hobbing cycle; batch hobbing of narrow gears with deburring attachment; plunge hobbing of narrow gears and worm wheels; and automatic magazine feed of pinions and shafts with continuous fully-automatic cycle. The machine accommodates standard hobs of 0.315-inch bore and approximately 1-inch diameter.

### **Diagonal Gear Shaving Machine Features Conventional Crowning**

National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich., has announced the addition of the conventional method of crowning, by rocking the machine table during the shaving cycle, to its Red Ring Model GCU Shaving Machine. Heretofore, crowning on this machine required a specially-form-

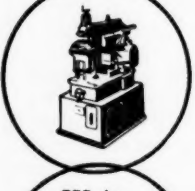
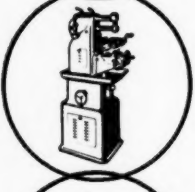
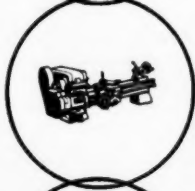


**Red Ring Model GCU Gear Shaving Machine** equipped for gear tooth crowning and differential automatic up-feed

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In savings of: tooling cost, power cost, operator cost and plant loading, as well as in extra profits from more pieces per hour, Sheldon Lathes often pay back their cost on a single run. They will work to the closest tolerances—have "Zero Precision" Tapered Roller Bearings. They can take a healthy cut when operating with high speed direct drive—have double V-Belts to the spindle. They will swing 10", 11" or 13" and have a 1½" hole through the spindle—have sufficient size capacity for the great bulk of lathe work. They have created a new factor for figuring machining costs, are tools you should know about.

## SHELDON MACHINE CO., INC.

4250 N. Knox Ave.,

Chicago 41, Illinois



ed cutter, but now it can be performed with any standard rotary cutter while the work gear is being reciprocated in line with its axis. The rocking action of the table is said to be accomplished by means of a central pivot and a cam which causes each end of the table to rise slightly as the end of the cutting stroke is approached.

When it is desired to shave gear teeth, spur or helical, without a crown, the crowning cam is disengaged, and the table then remains horizontal throughout its stroke. The pivoted table, it is claimed, also offers the possibility of shaving gear teeth to a predetermined taper by setting the table at the desired angle. The machine can also be supplied, as optional equipment, with a differential up-feed mechanism which provides automatic precision up-feed in selected increments throughout the shaving cycle and automatic return to the proper backlash position at the end of the cycle.

## Valve Is Designed for Operation of Pneumatic and Light Hydraulic Cylinders

Airelectric Corp., P. O. Box 208, Melrose Park, Ill., has announced a four-way valve for the operation of pneumatic and light hydraulic cylinders. The valve is of the D-slide type, with the port-exchanger slide being operated by a double-acting cylinder in one series and by a spring return cylinder in another series. The unit can be operated manually or electrically by interchanging the operating valve units.

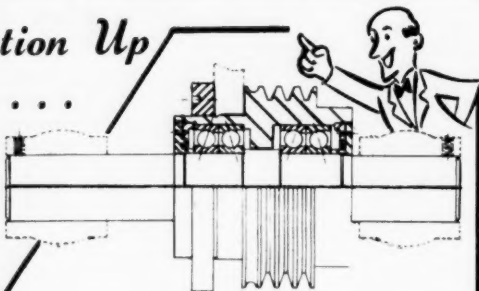
According to the manufacturer, the valve measures  $2\frac{1}{2} \times 2\frac{1}{2} \times 2$  inches in size and is capable of delivering media from full  $\frac{1}{4}$  to  $\frac{3}{8}$ -inch orifices. The valve is ported with cylinder ports at 90 degrees so that it can be mounted directly to the rear or side ports of cylinders. The unit can also be made with special porting arrangements to meet individual requirements.

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**EXCLUSIVE!** Light, small, compact,—sturdy and accurate—that's the Procunier Tru-Grip Tap Holder. It's another in a long line of engineering triumphs that have made Procunier Tappers the most popular in the industry. More and more users agree "It's the most efficient, most practical holder that ever gripped a tap." It has a slim ruggedness that permits easier tapping close to walls or shoulders with minimum interference. Easy to handle,

simple to use, has a wide-range tap capacity and a positive drive to tap that is unmatched. The tap holder and spindle are made in one piece, hardened and ground for precision accuracy, strength, longer trouble free life. The tap is driven by the squared end of the tap shank and is held in true alignment by the round of its shank—eliminating the possibility of "chewed up" or "marked" tap shanks. Takes prolonged wear and abuse, the Tru-Grip Tap Holder consistently gives top quality performance with a minimum of tap wear and breakage.

The Tru-Grip Tap Holder is only one of many features and advantages found in Procunier Tappers. Find out—Now—how industry is utilizing Procunier Tappers to cut costs, accelerate production and produce better quality work at minimum cost.

*Exclusive*

*a better*  
**TAP HOLDER**  
*in many ways*

**Write for Free Brochure**

Giving full particulars on the complete line of Procunier Tapping Equipment.



**Procunier**  
*Safety Chuck Company*

12 S. Clinton St., Chicago 6, Ill., Dept. 8

**PROCUNIER SAFETY CHUCK CO.**  
12 S. Clinton St., Chicago 6, Ill., Dept. 8

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

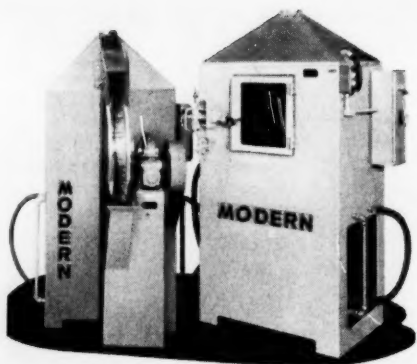
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## Machines Rapidly Deburr "Soft" Metal Parts

Fast production deburring of "soft" metal parts, using either a continuous rotating process for small parts or a stationary clamping arrangement for larger units, is said to be possible with two standard Maizo Blast machines, designated as the Model MA-24 and MA-1, developed by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 4, Mich. Both standard ma-



(Left) Modern Model MA-24 Maizo Blast Machine. (Right) Modern Model MA-1 Maizo Blast Machine



**NEW UNITROL®**

Down Acting Model 23

**CLIFTON LEADS**

in better-built hydraulic presses with the new exclusive

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**CLIFTON**  
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- No piping
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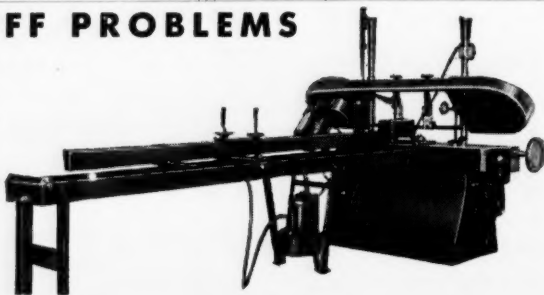
chine types are designed to remove light burrs from metals in the range of aluminum to mild steel. In both models, maize, or a similar "soft" material, is blasted against the parts under factory air line pressure.

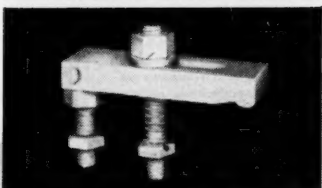
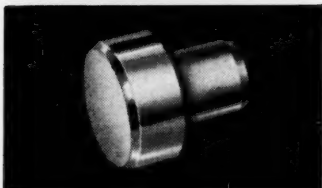
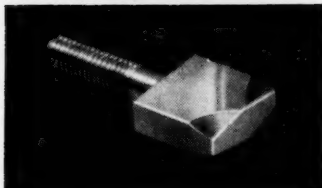
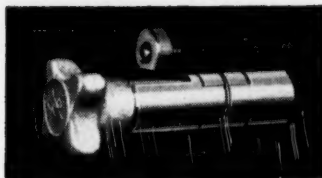
A ferris-wheel type fixture rotates continuously between two reciprocating blasting guns in the Model MA-24 at the rate of approximately one revolution every five minutes. The revolving wheel carries 16 to 24 pieces in holding wires and yields a production rate of 192 to 288 pieces per hour at 100 per cent efficiency. Larger parts not suitable to the continuous machine can be handled in the Model MA-1, a stationary unit in which parts rotate on a fixed axis in a fixture.

## SOLVE CUT-OFF PROBLEMS

Do a REAL job—faster and at lower cost. Our Models M, D, and J feature simplified hydraulic controls for both full and semi-automatic operation. Bar feed (shown here on Model M), other accessories, and hinge-type saws also available. Write for literature.

**W. F. WELLS & SONS**  
Three Rivers, Mich.

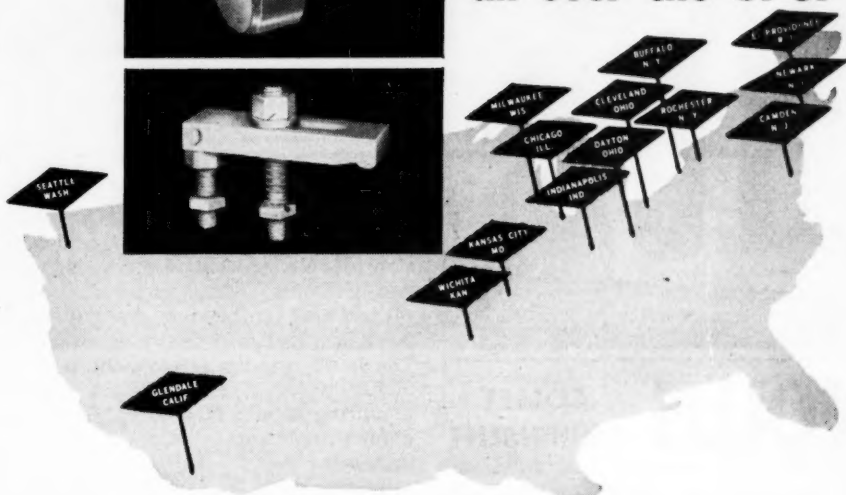




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Tool Products Co., 520 Park Ave.—DALLAS 1, TEXAS  
H. D. Geisler Co., 2715 Salem Ave.—DAYTON 6, OHIO  
Mfgs. Service Supply, 242 Taunton Ave.—E. PROVIDENCE 2, R. I.  
Art Lewis Product Equipment Co., 422 Magnolia Ave.—GLENDALE 4 CALIF.  
Standard Die Supply, 26 E. McCarty St.—INDIANAPOLIS 25, IND.  
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Roessel & Co., 683 Hudson Ave., ROCHESTER 21, N. Y.  
H. F. Soderling Co., 1745 4th Ave. South—SEATTLE 4, WASH.  
Midwest Die & Supply Co., 1671 Fernwood Ave.—TOLEDO, OHIO  
Cummings & Co., 115 E. Lewis St.—WICHITA 2, KAN.

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## Burring Machine Is Designed for Inside and Outside Surfaces

Designed to deburr, grind, and polish inside and outside surfaces with equal ease, a power-belt grinder which is available in both a bench and a portable model has been announced by United Machine Tool Co., 1902 Clyde Park Ave., S.W., Grand Rapids, Mich. The grinder is equipped with automatic belt tension, sealed bearing idler



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★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

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pulley and platen backing on one side for flat surface work, and unbacked belt on the opposite side for contour polishing.



United Portable Hand Grinder Attachment and Bench Model Burring Machine

The bench model is supplied with a 110-volt motor, with either a  $\frac{1}{4}$ -h.p. single horizontal arm or a  $\frac{1}{2}$ -h.p. single horizontal arm, double horizontal arm, double vertical arm, or vertical and horizontal arm. The bench model utilizes a 42 x 1-inch belt and can work holes  $1\frac{3}{4}$  inches in diameter or over. The hand grinder attachment is furnished with a 1.150-inch standard mounting hole to fit popular makes of hand grinders and utilizes a 12 x 1-inch belt.

**Quick  
Shipment on**

**TAPER  
ATTACHMENTS**

For All Lathes—Old or New—  
9" to 36" Swing

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**MASTER-TAPER COMPANY**  
4531 N. Beacon St., Chicago 40  
Excl. Mfrs. of Taper Attachments

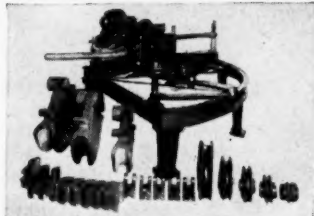


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to  
\$149.50**

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LINE OF COLD PIPE,  
CONDUIT AND HEAVY  
WALL TUBE BENDERS  
HAND AND POWER

ONE OF 10 HAND-OPERATED TYPES  
bending cold pipe from 1/4"  
to 6" I.P.S. inclusive



**MOTOR-POWERED TYPE E AND F**  
5 and 7 1/2 h.p. — Bend up to  
90° without a mandrel. Motor-  
Operated capacities 2 1/2" to  
6" inclusive.

AMERICAN PIPE BENDING MACHINE CO., INC., 14 Furnace Street, Poultney, Vermont



Up to 2" —  
Type A30



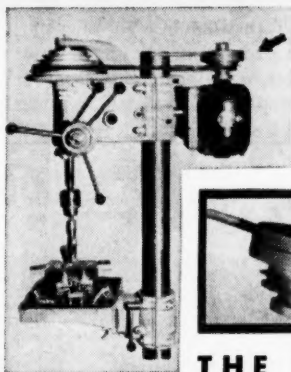
## COMBINATION BENDING TABLES

For hot or cold bends of various  
shapes, pipes, bars, etc. 5' sq.; 7' sq.  
(3 1/2' x 7' pairs) suitable for welding  
together. Other sizes or custom made  
to your specifications.

## New "PULL-GEAR" SPEED-REDUCING PULLEY Increases Drill Press Capacity

### NEW MODEL

Provides Correct  
Speed and Power  
to Drill Up to 1 3/8"  
with 1/2 H.P. Motor



Amazing new internally geared speed reducer  
doubles drill press capacity. Greater power,  
greater efficiency, greater productivity.

Provides the correct speed and power for larger  
drilling, reaming, tapping and boring on light  
presses. Easily installed in five minutes. Adapt-  
able to all type machines. Spindle  
speed range approx. 45 to 2000 RPM.  
Made in 3 motor shaft sizes: 1/2", 5/8",  
3/4". Write for literature.



Some Territories Open to Jobbers

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4118 E. 8-Mile Rd. • Detroit 34, Michigan

WRITE  
FOR  
LITERATURE



## Coolant Tube Features Unique Copper Core Design

An unusually flexible coolant tube which features a unique copper core that causes it to remain in almost any twisted shape until reshaped has been announced by Acrobat Co., 1923 Vineyard, Los Angeles 16, Calif. According to the manufacturer, the tube will not sag, droop, or wander away from the desired position, thus keeping the



Acrobat Coolant Tubes

coolant running to where it is needed. Made of Neoprene rubber, the tube, it is claimed, will not break loose or unravel at the ferrule and is immune from the deteriorating effects of oil and grease. The tube is available in most diameters and lengths and with any length tip. Special tubes can be made to user specifications.

**No. 4B PUNCH**

Capacity— $\frac{1}{4}$ " hole thru 1/16 gage iron.  
Length— $8\frac{1}{2}$ "; Depth of throat—2".  
Weight—3 lbs.

Stock size punches—1/16" to 9/32" by 1/64".  
Can be had complete in metal box as shown or in cardboard carton.

**W. A. WHITNEY MFG. CO.**  
640 Race St. Rockford, Ill.

## Mechanical Shaper Features Controlled Contact Drive

Kurt Orban Co., Inc., 205 E. 42nd St., New York 17, N. Y., has announced the Klopp Mechanical Shaper which features a controlled contact drive in which pressure between the friction wheel and the drive wheel is said to always be proportionate to the load on the machine. With the drive, it is claimed, a single lever controls the on

## PRODUCTION INCREASES... with TROYKE ROTARY TABLES



Sizes:  
9 - 12 - 15 - 18 - 21 - 25.

See your dealer or write for Catalog No. 17, fully illustrated, showing all models and applications to various work.

**Troyke Mfg. Co.,**



Dividing Attachments can be furnished for all models of Wormwheel operated Rotary Tables except the Model BH-9.

Cincinnati 9, Ohio, U. S. A.

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available  
with  
**EXTRA**  
**FEATURES**  
at no  
**EXTRA**  
**COST!**

... this NEW

**STERLING Model "G"**

**UNIVERSAL TOOL & CUTTER GRINDER**

Completely new from base to wheel-head. Built with extra features that give you **FASTER** and **MORE EFFICIENT** grinding. Get the complete specifications. Send for new catalog.

**MCDONOUGH** MANUFACTURING  
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**SINCE 1931, EXPERIENCE IN**

**PRECISION  
CENTERLESS  
GRINDING**

Single or multiple diameter pieces.  
High in quality—accurate to blue-  
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to handle large or small lots.

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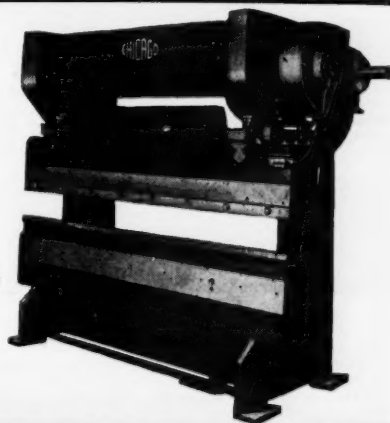


**STEEL  
PRESS  
BRAKES**

### **43 Standard Sizes**

Readily adapted for a wide variety  
of bending, forming, drawing, notching,  
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**DIES** Complete Line of Induction  
Hardened Dies for All Makes and  
Sizes of PRESS BRAKES.



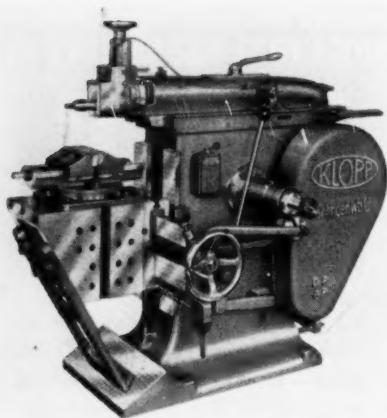
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**MANUFACTURING COMPANY**

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**CHICAGO**

STEEL BENDING BRAKES  
BOX and PAN BRAKES  
PRESS BRAKES



Kloppe Mechanical Shaper with controlled contact drive

and off positions of the motor, engaging and disengaging of the drive, and setting and releasing of the brake which stops the tool head; and the

motor is always started under no-load conditions without the use of a mechanical clutch. In the controlled contact drive, the motor is mounted on a base plate designed as a see-saw. In the running position, a spring presses a wheel of specially compounded synthetic rubber which is mounted directly on the motor shaft against the cast iron drive wheel of the machine.

In starting the shaper, the movement of the control lever first actuates a switch to start the motor, with the drive disengaged. The brake shoe, which is pressed against the drive wheel in the off position, is released, and gravity draws it away from the drive wheel. The friction wheel and drive wheel are then engaged. The motor can be turned off from a table switch, but can be turned on only by the control lever, thus providing safety for the operator. The shaper is available with stroke lengths of either 16 $\frac{1}{4}$ ", 20 $\frac{2}{3}$ ", and 26 $\frac{5}{8}$ " inches.



# HANCHETT

circular saw sharpeners

for RIP, CROSSCUT and  
SMOOTH TRIM SAWS

FULLY AUTOMATIC

Available with Hanchett Airshift\*  
and new pedestal Mounting Stand  
6" to 36" dia. — other sizes  
up to 84" dia. and larger.  
\*over 15% less moving parts

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World's Largest Manufacturer of Saw Sharpening and Knife Grinding Machinery

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WEST COAST — Portland 4, Oregon





**MARK and DEMAGNETIZE  
IN  
ONE OPERATION**

THE  
*Luma*  
TOLEDO, OHIO  
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The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

**Luma Electric Equipment Co.**  
P. O. BOX 132-MS TOLEDO 1, OHIO

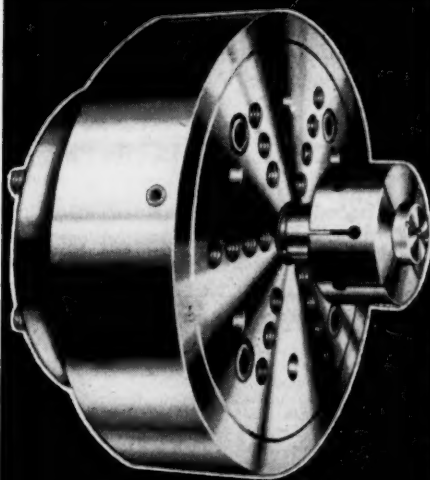
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*Heavy Duty  
Live Centers*



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
9. Service is prompt.

Speedgrip Precision  
Internal Chucks will save  
you money on second  
operation work.

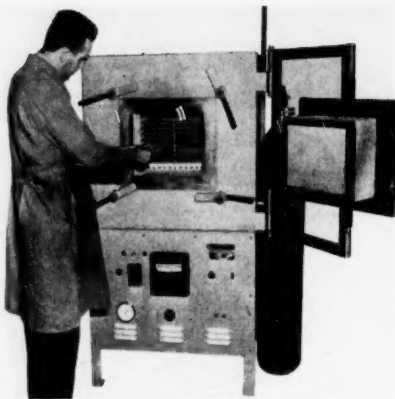
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**SPEEDGRIP CHUCK** 820 N. WARD STREET  
ELKHART, INDIANA

## High-Temperature Electric Vacuum Furnace for Production and Laboratory Use

Designated as the "Airfre," a high-temperature electric vacuum furnace which is designed for production and laboratory use where temperatures up to 2,500 deg. F. and vacuums up to 29 inches are required has been announced by K. H. Huppert Co., 6841 Cottage Grove Ave., Chicago 37, Ill. The furnace is available in a large number of



Huppert "Airfre" High-Temperature Electric Vacuum Furnace



**NEW NESTING TYPE  
TOTE PANS**

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6 1/4" deep. Drag  
holes and handles at  
both ends.

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## RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

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different sizes and is supplied complete with vacuum pump and other necessary control equipment, such as gages, automatic pressure controller, variac, ampere meter, timer, and automatic temperature controller.

According to the manufacturer, the furnace and the vacuum system can be used independently if desired, and higher vacuum for special applications can be supplied.

## Fixed Center Drill Heads Feature Shaved Gears

United States Drill Head Co., Cincinnati 4, Ohio, has announced that all its fixed center drill heads now have

## READING BENCH KEYSEATER

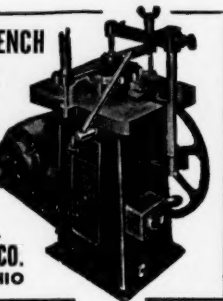
Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

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## LINLEY noiseless RIVETING MACHINES



### Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY. Sizes and types for iron and cold rolled steel rivets up to  $\frac{3}{8}$ "', larger capacity for rivets of softer materials.

Send today for bulletin R.

**LINLEY BROS CO.**

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## MARK IRON, STEEL and CARBIDES



THE  
*Etchograph*  
WAY

Original Electric Etcher, Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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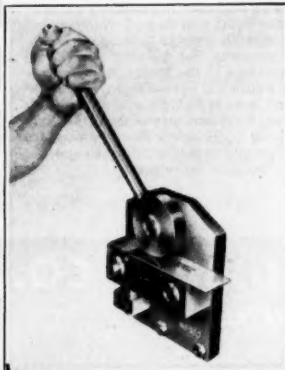
**ACROMARK**

## POWER MARKING MACHINES

(SERIES 9A—POWER DRIVEN)

Are the last word for high production, high precision marking. A powerful gear reduction motor does the driving. Clutch operated. Fast, smooth and quiet.

MODEL 9AMP—MOTOR DRIVEN, PEDESTAL MODEL SHOWN—



## HAND MARKING MACHINES No. 920

Shown at left are frictionless. A double row SKF precision ball bearing carries the plate or part as it passes under the roller die.



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Latest  
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The  
**ACROMARK**  
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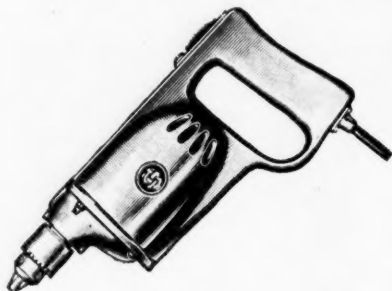
9 MORRELL ST., ELIZABETH 4, N. J.  
"THE ORIGINAL MARKING SPECIALISTS"



shaved gears which are claimed to provide longer gear life, quieter operation, smoother action, absolute minimum backlash for more accurate tapping, and allowance for higher speeds to cope with present-day production methods.

According to the manufacturer, the heads are shaved in a heat-treated state for maximum accuracy and minimum deformity, and reduce down time and maintenance. In addition, the shaved gear heads are said to automatically eliminate chatter on spot-facing, boring, and trepanning operations.

tinuous duty. Designated as the Model 14-AU, the drill features full ball-bearing construction, strong aluminum-alloy frame, heat-treated alloy-



U. S. Model 14-AU 1/4-Inch Electric Drill

### 1/4-Inch Electric Drill Is Designed for Continuous Duty

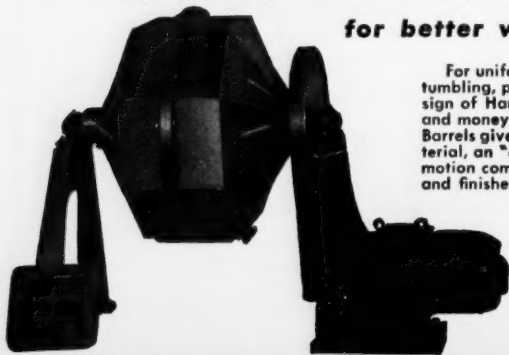
The U. S. Electrical Tool Division of The Emerson Electric Mfg. Co., St. Louis 21, Mo., has announced a 1/4-inch electric drill which is designed for con-

steel gear, Jacobs three-jaw geared chuck, and powerful universal motor. The no-load speed of the drill is said to be 2,500 r.p.m. The drill has an overall length of 10 1/2 inches and weighs 5 pounds.

### HARTFORD TRIPLE ACTION

## CUTTING and TUMBLING BARRELS

*for better work in less time!*



For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique design of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the material, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

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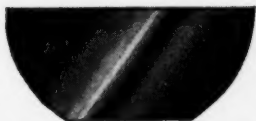
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GUARANTEE TRUST BLDG.  
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55 W. 42ND ST., NEW YORK

24582

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We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as  $\frac{1}{8}$ " x  $\frac{1}{16}$ " to keys as large as  $3\frac{1}{2}$ " x  $\frac{1}{4}$ ". All keys are carefully checked for burrs, slivers, etc. before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

### STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS PENNSYLVANIA  
PLANTS BEAVER FALLS, PA. • HAMMOND, IND.

## Micro Supreme LAY-OUT AND IDENTIFICATION DYE

7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

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8615 Grinnell Ave. • Detroit 13, Mich.

## Dependable MEASURING & CHECKING EQUIPMENT

and Now

HAND WHEELS, KNOBS, HANDLES

**Cadmium Plated**

Non-rusting — good looking



STRAIGHT and OFFSET TYPE



CAST IRON

SOLID ROTARY  
MACHINE HANDLES



MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.

READY  
TO  
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UNIVERSAL ANGLES  
In 10 sizes, ranging from  
4 x  $3\frac{3}{4}$  x 5 and up.

BOX PARALLELS  
In 15 sizes, ranging from  
3 x 4 x 12 and up.

SLOTTED ANGLES  
In 19 sizes, ranging from  
4 x 9 x 5 and up.



SURFACE PLATES  
Over 50 sizes, ranging from  
7 x  $7\frac{1}{2}$  to 96 x 192.

Send for Complete Catalog

## MACHINE PRODUCTS CORPORATION

6771 E. McNichols Rd.

Dept. D

Detroit 12, Mich.

## Tracing Template for Jig and Fixture Components

Northwestern Tool & Engineering Co., 119 Hollier Ave., Dayton 3, Ohio, has devised a tracing template for jig and fixture components that covers 263 items in full scale on a single sheet measuring 11 x 25 inches. The sheet is folded in two places to measure 8½ x 11 inches. Designed for tool designers, the condensed template eliminates paging through bulky sheets and cata-

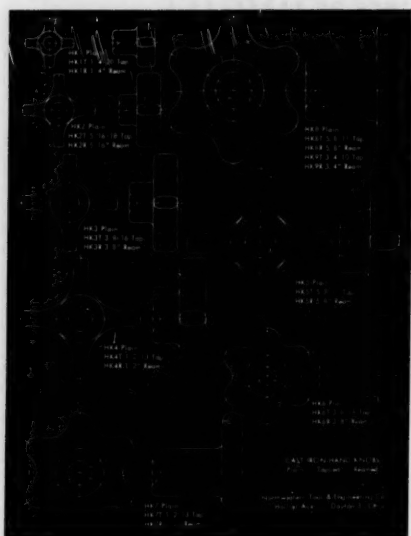


Illustration showing portion of Northwestern Tracing Template for jig and fixture components

## CAMS

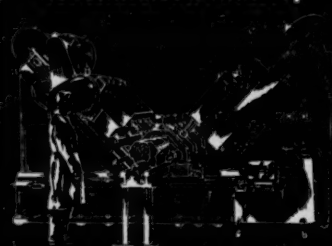
We are fully equipped to **GRIND OR MILL** a complete range of CAMS to your specifications on our **ROWBOTTOM** Cam Milling Machines.

Your inquiries answered promptly.

**HIMOFF MACHINE CO., INC.**

23-16 44th Road Long Island City 1, N. Y.

SINCE 1901  
**MOLINE "Hole-Hog"**  
Specially Designed  
**MACHINE TOOLS**  
have cut production costs  
for American Industry



**Boring V-8 Engine Cylinders**



**DRILLING • BORING  
HONING • TAPPING  
and Special Machines**

logs looking for suitable standard tools. The white on black background is designed to relieve eye strain and to eliminate "missed" lines and contours in tracing. The template is available without cost upon request.

## Straight-Sided Double-Crank Press Has 525-Ton Capacity

The Cleveland Straight-Sided Double-Crank Press illustrated here-

**CUT  
TOOL  
COSTS**

broken tools  
made like new again  
with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Horse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

**NO WELDING!**  
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**NU-TANGS INC.**

1339 Bates Avenue  
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... makes the finest in  
CAP SCREWS • SET SCREWS  
COUPLING BOLTS  
MILLED STUDS



*Wm.  
H.*  
**Ottemiller Co.**  
YORK, PENNA.

## RAYMAC *Solid Carbide* DRILLS and REAMERS

Raymac drills cut hardened metal  
... do not burn or anneal. Feature  
operational speeds of 350 to  
600 RPMs depending on size and  
hardness of metal.

Raymac solid carbide reamers are  
custom designed for individual  
jobs.

Write for catalog No. 12

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MANUFACTURING COMPANY INC.  
3729 CASS AVENUE, DETROIT 1, MICH.

## You Get **POWER UNLIMITED**

with featherweight

*Mall* **PRECISION  
AIR TOOLS**



You're not limited to ampere ratings and voltages with air power. MALL pneumatic tools let you pour on the power shift after shift. Lightweight MALL air tools eliminate worker fatigue—boost production. Choose from among many styles and sizes of MALL.

POLISHERS  
DISC SANDERS  
ANGLE DRILLS  
STRAIGHT DRILLS

NUT SETTERS  
SCREWDRIVERS  
IMPACT WRENCHES  
GRINDERS

*Pictured above—No. PG-K-1030L—  
"Midget" collet die grinder.*



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1953 MALL  
PNEUMATIC  
TOOL CATALOG.

### MALL TOOL COMPANY

7814 S. Chicago Ave., Chicago 19, Illinois

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MU-31

## QUALITY Depends on ACCURATE INSPECTION



Accuracy of measurement depends on the precision of the measuring tools. Provide your shop and inspection department with dependable and proper inspection tools. MEEHANITE METAL TOOLS, made to close tolerances, are furnished in many types.

Surface Plates — Box Parallels  
Slotted Angle Plates  
Universal Right Angles  
Flat Parallels — Lapping Plates  
Toolmaker's Knees — "V" Blocks  
Straight Edges (Bridge Type)  
Straight Edges (Leveling Type)  
Measuring Irons  
Masterangle Plates  
Angle Attachments

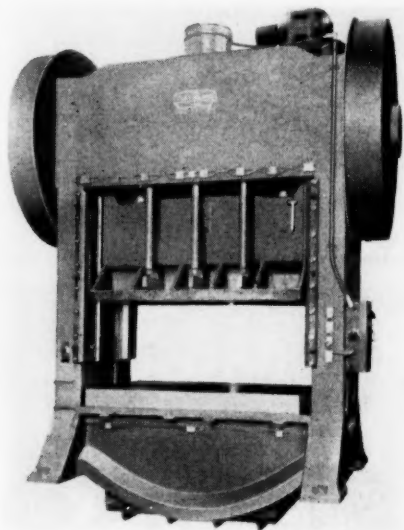
Send for Bulletin

### ACME TOOL CO.

73 W. Broadway, New York 7, N. Y.

with, product of The Cleveland Punch & Shear Works Co., Cleveland 14, Ohio, is double geared, features a twin drive, and is equipped with a two-station electrically-controlled air-operated drum-type clutch with spring-loaded brake. The press is designed with air counterbalance to the slide, and the flywheel is provided with an auxiliary air brake to bring it to a quick stop when the power is shut off.

The bed of the press is arranged with



Cleveland Straight-Sided Double-Crank Press

a 91-ton pneumatic cushion in two units, with air manifold controls, so that cushion units may be operated independently of each other. The press has a stroke of 16 inches, 12-inch adjustment of the slide, 32-inch distance from the bed to the slide (stroke up and adjustment down), 60 x 96-inch bed and slide area, and capacity of 525 tons. The gears operate in a bath of oil, and the drive is by multiple V-belts from motor to fly-wheel.



## CONTINUOUS HINGES

Manufactured by

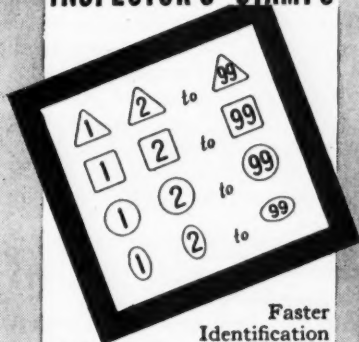
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& MFG. CO.**

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CHICAGO 19

## INSPECTOR'S STAMPS



**Faster  
Identification**  
of Inspectors or Operators.  
Different borders may be used  
for different shifts. Available  
in 4 sizes. Write for prices  
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**NEW METHOD STEEL STAMPS, Inc.**

145 JOS. CAMPAU

DETROIT, U. S. A.

# automation

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Build more flexible "working circuits" into your basic machinery control system with P & B relays for . . . Screw Machines • Boring • Drilling, Tapping • Honing Lathes • Hobbing Indexing • Hydraulic Interlock

Buy stock model P & B relays from your local Electronic Parts Distributor. P & B field engineers located in principal U. S. & Canadian cities.

Write for Bulletin 100 illustrating over 100 types of standard relays.

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BRUMFIELD**

DEPT. MS • PRINCETON, INDIANA



Heavy Power  
Relays



Shock-Proof  
Relays



Medium Power  
Relays



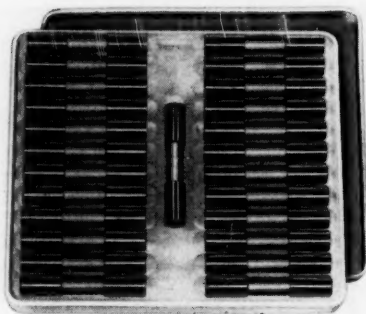
Telephone  
Relays

Also voltage  
actuated, current  
actuated, sensitive,  
hermetically sealed  
and plug-in  
types.



## Plug Gage Set Is Versatile

A 25-piece plug gage set announced by Deltronic Corp., 9010 Bellanca Ave., Los Angeles 45, Calif., consists of one gage of nominal size, 12 gages increasingly larger in 0.0001-inch increments, and 12 gages increasingly smaller in 0.0001-inch increments. In addition to their use as "go" and "no-go" gages, they can also be employed as both "work" gages and inspection gages, as well as layout pins. Every gage is iden-



Deltronic Plug Gage Set

tified and is the same size on both ends to assure long use. Each set is furnished in a durable compact plastic case and is available in nominal sizes from  $\frac{1}{8}$  to 1 inch, in increments of  $\frac{1}{64}$  inch.



### WADE ENVELOPES

*protect*  
**Shop Orders, Drawings,  
Blueprints, Etc.**

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

*Write for details.*

### WADE INSTRUMENT COMPANY

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## OK T-slot Bolts

The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths:  $\frac{1}{2}$ "—\$1.36;  $\frac{3}{4}$ "—\$1.36; 1"—\$1.50; 1 $\frac{1}{4}$ "—\$1.89. Write for price list.

**THE O K TOOL COMPANY, INC., Milford 4, N. H.**

## Copying Lathe Provides for Push-Button Metal Turning

Identified as the H.E.B. Pilote, a completely automatic hydraulic copying lathe equipped with a hydraulic carriage feed has been introduced by H.E.B. Machine Tools, Inc., 475 Fifth Ave., New York 17, N. Y. In use, the operator has only to load the machine and press a button to start the cycle. When the part is finished, the tool returns to its starting position and the spindle stops automatically.

The cross slide is arranged at 90 degrees to the bed and provided with



# Specify



## SHIM STOCK

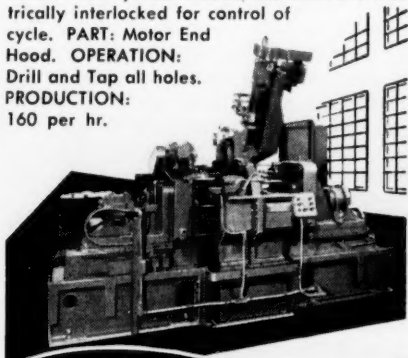
Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015" sheets 6" x 12"; coils 120", identified every 6" by thickness and amount remaining on roll.



### DETROIT STAMPING COMPANY

349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

No. S.O. 3787—4-Way Hydraulic Drilling and Tapping Machine equipped with two 10-H.P. Way Type Drilling Units and two 2-H.P. Drill Units. It has a 4-Station trunnion type index fixture with hydraulic actuation. Units are electrically interlocked for control of cycle. PART: Motor End Hood. OPERATION: Drill and Tap all holes. PRODUCTION: 160 per hr.



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U.S.A. Sales Representative,  
Arnold J. Werner Co.,

New Center Bldg., Detroit 2, Michigan

for rotary  
files  
it's



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Make Haskins your reliable source for finest hand-cut ground or carbide cutters. Faster cutting, longer tool life, fewer sharpenings. Cut labor and over all tool costs. All shapes, types and sizes. For catalog, write



**R. G. HASKINS COMPANY**  
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**DIAMOND  
LAPPING OIL**

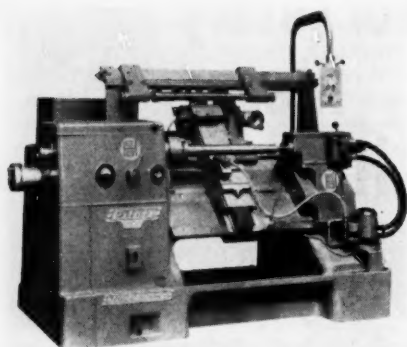
## HOW TO GET 100% MORE LIFE FROM YOUR DIAMOND WHEELS

It's a fact that wet grinding will actually increase diamond wheel life as much as 100% through decreased wear. Stadoil removes all gum or glaze—keeps wheels from loading and enables the operator to get extra fine tool edges *without pressure*. Stadoil is recommended by all diamond wheel manufacturers for carbide tool grinding. It is an excellent thinner for diamond lapping compounds and as a carrier for diamond dust. **OVER 6,000 INDUSTRIAL USERS . . .** 18 years of industry service. Get Stadoil in ½ pint to 50 gal. quantities and see how Stadoil can cut your diamond wheel costs and increase tool life.

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**STADOIL MANUFACTURING CO., EL MONTE 3, CALIF., U.S.A.**



H.E.B. Pilote Automatic Copying Lathe

slots to enable it to be equipped both with front and back tools, as well as a boring bar. Its transverse motion is controlled hydraulically by the copying device, following a flat templet fixed in an indexing drum which is designed to carry a maximum of eight different

templets. The front and back tools may both be used for copy turning, using a different templet for each cut. The back tools can also be arranged for plunge cutting automatically, or may be used for taking a light finishing cut. A surface finish of better than 32 microinches is said to be easily maintained since the hydraulic carriage feed may be reduced at any predetermined point. This feed also enables the cutting cycle to be rapidly set.

The bed and base consist of a one-piece casting of roughly triangular cross-section, affording great rigidity. The ways are hardened and ground inserts of nitrided steel having a hardness of Rockwell 68 C.

The machine is normally equipped with a 20 h.p. motor and has a spindle speed range of 380 to 3,000 r.p.m. The feed range is from 0.0015 to 0.035 inch. The Pilote 51 will swing work up to 14 inches in diameter over the bed and 7 inches in diameter over the cross slide.

## Use *Anderson* BALANCING WAYS No Leveling Required

With Anderson Balancing Ways it is easy to balance any rotating object in a fraction of the time formerly required by other methods. Simply place the Ways on the floor or bench and they are ready to use without adjustments of any kind.

The revolving, chilled iron discs and the spindles, are ground and balanced to extreme accuracy. Spindle bushings are hardened—glass hard—yet without danger of breaking. This eliminates the possibility of wear or ball bearing indentations on spindles or bushings when heavy weights are placed on the ways.

They save time, save labor, and assure better work.



Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



Write for Bulletin 8-22

**ANDERSON BROS. MFG. CO., Rockford, Ill.**

*Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.*

## MICRO-HEIGHT GAUGE . . . .



### FOR FAST, ACCURATE LAYOUT

A new precision height gauge which reads like a micrometer and measures zero flush at base. Has a direct reading of 2" with scriber in upright position, and 3" with scriber reversed.

Replace scriber with dial indicator and Micro-Height Gauge measures center distances between holes or surfaces. As indispensable as a micrometer to toolmakers, layout men, and inspectors.

*write for circular and prices*

### FAIRFIELD GAUGE COMPANY

174 HERBERT STREET  
BRIDGEPORT 6, CONNECTICUT

## GRANT RIVETERS



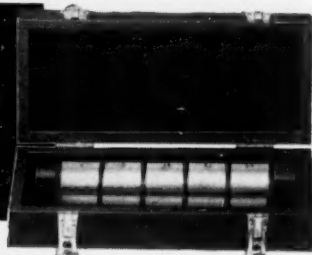
• Pioneers in the riveting field. Head rivets from smallest to  $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.  
96 Silliman Ave. Bridgeport 5, Conn.

## Check Surface Roughness Waviness and Lay INSTANTLY ... Right At The Machine



### With ACME'S ROUGHNESS COMPARISON SPECIMENS



Available in groups of 3, 5 and 8 specimens. Low cost.

Consists of various surface specimens, individually finished to definite micro-inch readings, grouped together in one handy comparison bar. Merely hold bar opposite work for fast, visual comparison check of surface roughness, waviness and lay.

**ACME  
INDUSTRIAL  
COMPANY**

Mfr's. of Drill Jig & Fixture Bushings  
212 N. Laffin St. Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR OVER A QUARTER CENTURY

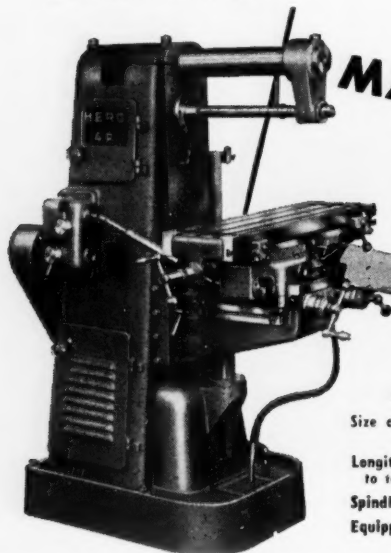
The spindle bore is 2 inches. A larger machine, the Pilote 76, will swing work up to 15 $\frac{3}{4}$  inches in diameter over the bed and 8 $\frac{1}{4}$  inches over the cross slide. The spindle bore is 3 inches. This model is designed to accommodate motors up to 60 h.p. to provide sufficient power when fitted with two cross slides and two infeed attachments. Drills and boring bars may also be used in the tailstock and fed hydraulically.

## Bin Unit Has Widespread Application for Storage and Display of Parts

A bin unit announced by Lyon Metal Products, Inc., Aurora, Ill., has widespread application for storage and display of parts or packaged items. All shelves adjust vertically, making space available for items of all sizes. Several models of the bin are available, offering different divider arrangements to

provide various sized openings. Some models are also furnished with shelf boxes, especially designed for small

PROMPT DELIVERY  
SALES TERRITORIES OPEN



**HERO  
MILLING  
MACHINES**  
PLAIN and  
UNIVERSAL  
Measurements in  
English and Decimals

### PARTIAL SPECIFICATIONS

Size of table.....29 $\frac{1}{2}$ "x9-1/16"  
39 $\frac{3}{4}$ "x9-1/16"

Longitudinal power feed  
to table.....19 $\frac{1}{2}$ "

Spindle speeds (12) 53-1250 RPM

Equipped with anti-friction bearings.

### THESE EXTRAS ARE AVAILABLE

Slotting Attachment  
Vertical Head

Dividing Head  
Rotary Table

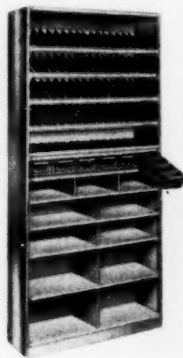
Vise  
Space Attachments

• Write us for further information and prices!

**MOREY**  
*for machine tools!*

**MOREY MACHINERY CO., INC.**  
Manufacturers • Merchants • Distributors

410 BROOME STREET • NEW YORK 13, N. Y.  
CANAL 6-7400 • CABLE ADDRESS: WOODWORK, N. Y.



Lyon Bin Unit

quantities of small parts, nuts, bolts, washers, and various other items.

Supplied set up and ready for use, the bin unit is 3 feet wide x 1 foot deep x 6 $\frac{1}{2}$  feet high and is provided with a green baked-on enamel finish.



## DORMAN AUTOMATIC REVERSE TAPPERS

• Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.

• WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

No. 2B POSITIVE TAPPER—capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER—capacity 1/2" to 1 1/4" in Steel—1/2" to 3/4" Pipe Taps.

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

• PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from  
**\$48.00**  
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**IMMEDIATE  
DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION

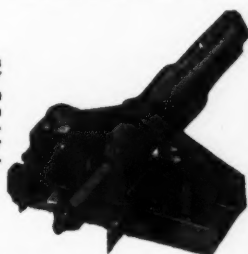
Division of Thomson Industries, Inc.

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRUMHEADS

## Cut Costs on Hole-Cutting! USE THE NEW . . . BOREMASTER

Finished holes  
1 1/2" to 1 3/4"  
diameter to a  
depth of 8" in  
one rapid operation on your  
present equipment!



BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember . . .

TIME SAVINGS + MATERIAL SAVINGS  
= COST SAVINGS

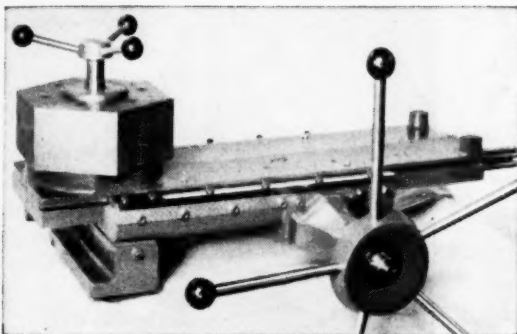
• Write us today for complete details!

**KARL A. NEISE**

Master Tools for Modernized Machining

404 4th Ave., Dept. MMS, New York 16, N. Y.

## LYNN TURRET SERIES F-BT3 — for Lathe Swing 15"-to-26"



Head . . . . . 9 1/2"  
Tool Hole . . . . . 1 1/2" to 2"  
Working Travel . . . . . 10 1/2"  
Over-all Length . . . . . 35"  
Swings 6" Box Tools  
Weight . . . . . 470 lbs.

Self-Indexing for Fast Production  
Easily Adjustable for Alignment  
and Wear

Less Experience Needed to  
Operate

Only manufacturer of  
conversion turrets.

Turrets available for smaller Lathes  
WRITE, OR PHONE ATLANTIC 7267

**LYNN MANUFACTURING CO.**

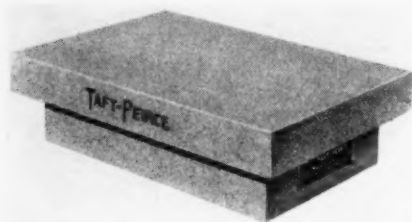
1121 SOUTH SEVENTH ST.

MINNEAPOLIS, MINN.



## Surface Plate Is Made of Extra-Fine Blue-White Granite

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has announced a surface plate made of extra-fine even-grained



Taft-Peirce Granite Surface Plate

blue-white granite. The angle of grain to the working surface is approximately 45 degrees, a unique characteristic which minimizes the possibility of chipping or plate breakage. This structural

strength and the inherent hardness of blue-white Westerly granite are said to ensure durability and long wear without the need of frequent surface re-finishing.

The plate is precision ground and lapped, and surface accuracy, it is claimed, is not affected by ordinary temperature changes. The working surface is extremely smooth; yet the natural pores of the granite are said to prevent wringing of tools and assure free movement. Moreover, because of the fine grain and low porosity, the surface does not become readily impregnated with dirt or grit particles to cause abrasion. The working surface may be quickly and easily cleaned with ordinary solvents such as alcohol or carbon tetrachloride. Due to the extremely close grain and low moisture absorption of the granite, tools or work left on the surface are not subject to rust.

### SPECIAL PURPOSE

## Micrometers

**TUMICO Blade Micrometer**—Shown at right —Measures narrow depth grooves, slots, keyways, splines, square threads and similar surfaces. Blade thickness .030". Hardened, ground, lapped.

Other Tumico special purpose micrometers are made in a wide range of styles and sizes. Specially shaped mandrels measure lands, ribs, threads, extrusions, tubes, rounds, and other shapes and surfaces that are difficult to reach and gage.

Special purpose Tumico tools not only measure precisely but speed production and inspection. Tumico catalog No. 22 shows many of these tools. Write today.

**TUBULAR MICROMETER CO.**  
BOX 40, ST. JAMES, MINNESOTA



**TUMICO**

**DOES IT BETTER  
DOES IT FASTER**

## **SIMPLEX-M ABRASIVE BAND GRINDER**



The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

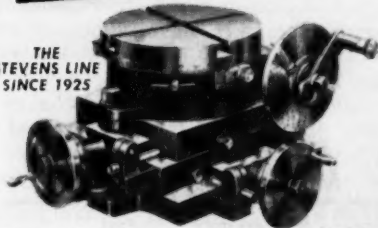
**OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY**

**WALLS SALES CORP.**

333 Nassau Avenue, Brooklyn 22, N. Y.

**COMBINED TRANSVERSE AND  
CIRCULAR MOVEMENTS ON  
STEVENS #1 COMPOUND TABLE**

THE  
STEVENS LINE  
SINCE 1925



Combines 3 3/4" longitudinal and 3 3/4" transverse movements with circular movement of 7 1/2" Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

**WRITE FOR BULLETIN**

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

**The John B. Stevens Company**

Main Street, Somersville, Conn., U. S. A.

**DEALERS  
Write for  
Our  
PROPOSAL**

## **IN PLANTS LARGE & SMALL BARKER Bench Type "MILLERS"**



Exclusive  
3-Way  
Travel

are performing countless close tolerance machining operations on big run jobs. You can easily effect a 50% economy in the milling costs of small parts.

We have hundreds of customers whose repeat orders signify satisfaction.

Get all the facts on this versatile "miller."

**PRODUCTION  
MODEL**

**WRITE FOR  
LITERATURE**

**BARKER 3 1/4"**  
Graduated Swivel  
Base



Vise



**Straddle milling using  
our standard stub  
arbor.**



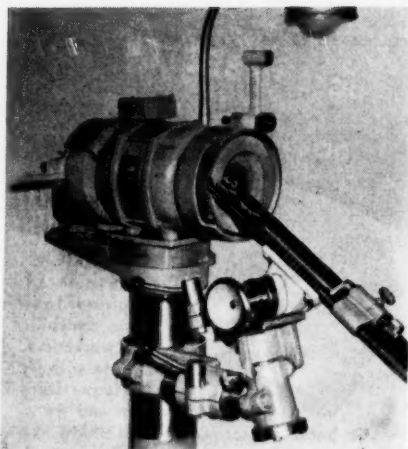
**Slotting with our  
standard stub arbor.**

**BARKER ENGINEERING COMPANY**

502 GREEN ROAD  
CLEVELAND 21, OHIO

## Improved Drill Grinder Provides for Greater Operator Convenience

Improvements on the Sterling Model "DA" Drill and Carbide Grinder designed to provide for greater operator convenience have been announced by McDonough Mfg. Co., 1521 Galloway, Eau Claire, Wis. The improvements include the replacing of two conventional hex nuts requiring wrenches with quick-action levers, thus speeding up the simple adjustment for



Sterling Improved Model "DA" Drill and Carbide Grinder

**...for more than  
1001 jobs**



**HJORTH LATHE & TOOL CO.**  
8 BEACON STREET WOBURN, MASS.

changing drill sizes and eliminating the need of a wrench which frequently is misplaced.

According to the manufacturer, other minor refinements in the drill grinder have also been made.

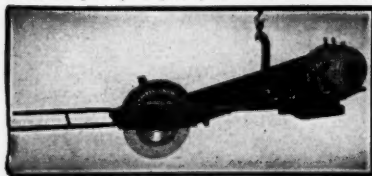


## Black Granite Straightedge

Designed for precision measurement and checking of surfaces of machine tool beds and areas where flat surfaces must be checked with accuracies up to 0.00005 inch, a straightedge which is made of black granite and which is

## MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular  
**MUMMERT-DIXON CO.**  
120 Philadelphia St. • Hanover, Pa.



Collins Black Granite Straightedge

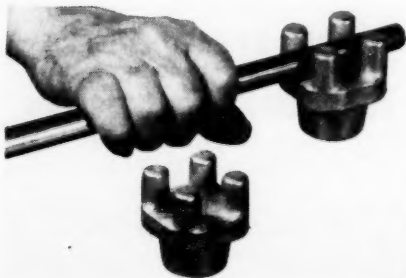
available in lengths up to 48 inches has been announced by Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, Calif. According to the manufacturer, the straightedge is temperature-inert, velvet smooth, and never requires oiling. The surface of the straightedge, it is claimed, will not rust or corrode, regardless of atmospheric conditions.

The ends are tapered and fitted with leather grips for easy, secure handling. A special storage case is provided with resilient nesting pads to protect the surfaces.

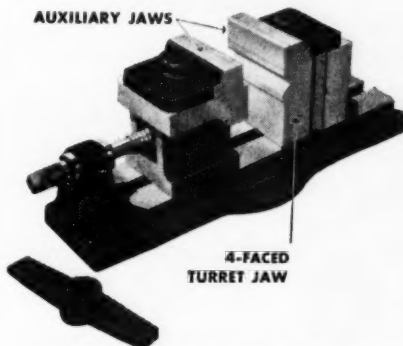
### Bar Knob Provides Maximum Leverage

Made of malleable iron and cadmium plated, a bar knob which is available in  $2\frac{1}{2}$  and  $3\frac{1}{2}$ -inch diameter sizes and which provides maximum leverage has been announced by Morton Machine Works, Dept. 75, 2421 Wolcott, Detroit 20, Mich. The  $2\frac{1}{2}$ -inch

Morton Bar Knobs



# SAVE SET-UP TIME



**Holds round, oval, square, octagonal, rectangular, flat and angular work without special jigs**

Both men and machines put more time on productive work when Brown Vises are used because turret jaw faces and auxiliary jaws eliminate time wasted in "riggin" set-ups.

Quality is improved because husky vise (it weighs 96 lbs.) holds work tight. Jaws open to  $9\frac{1}{2}$  inches. Clamping flange surrounds entire vise.

For complete specifications and prices write for Bulletin 23Y, Brown Engineering Co., 120 N. 3rd Street, Reading, Pa.

## BROWN

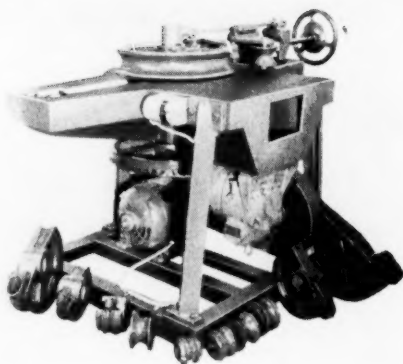
## UTILITY

## VICES

diameter size is available with  $\frac{1}{2}$ ,  $\frac{5}{8}$ , or  $\frac{3}{4}$ -inch holes, reamed and tapped. The  $3\frac{1}{2}$ -inch diameter size is supplied with  $\frac{3}{4}$ ,  $\frac{7}{8}$ , or 1-inch holes, reamed and tapped.

### Machine Bends 1/2 to 2-Inch Pipe up to 180 Degrees

Designated as the Type 2PBR, a machine which is designed to bend  $\frac{1}{2}$



American Type 2PBR Pipe Bending Machine

### Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.

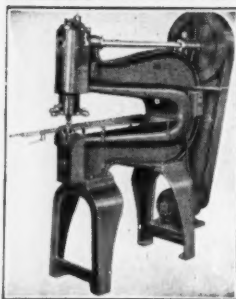


Write for circular and prices

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## SAVAGE NIBBLING MACHINES



CAPACITIES  
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FOR TUBE SLOTTING, TUBE SHAPING  
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TEMPLATE OR TO A SCRIBED LINE.

**W. J. SAVAGE COMPANY**  
Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

to 2-inch U. S. Standard pipe at radii approximately five times the pipe size, up to 180 degrees, has been announced by American Pipe Bending Machine Co., Inc., 14 Furnace St., Poultney, Vt. According to the manufacturer, the minimum radius of bend the machine can handle is five times the pipe size, and the maximum radius of bend is 13 inches. The machine will handle bends up to  $1\frac{1}{2}$ -inch extra heavy and  $1\frac{1}{2}$ -inch double extra heavy; however, it is not designed for heavier bends.

The machine is supplied complete and includes a standard 2-h.p. motor and drum-type reversing controller, as well as all rollers and quadrants for the fixed bends available within the capacity of the machine.

### HIGH SPEED DRILLS

FLAT TWISTED AND ROLLED SECTION



Special Lengths and Types  
PROMPT DELIVERY

Manufacturers Since 1903

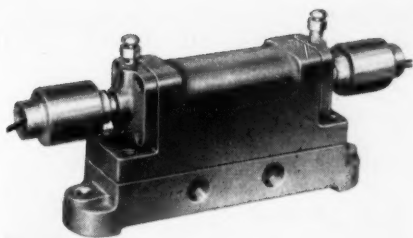
**HI-DUTY DRILL WORKS**

FLEETWOOD, PA.

### Pilot-Operated Valve Is Available in Two Types

Designated as the "Nopak" Model "V," a four-way slide valve which is available in two types (Types "R" and "AR") and which can be pilot operated by cam, hand, or foot control poppets, or by solenoid pilots, has been announced by Galland-Henning Mfg. Co., Nopak Division, 2758 S. 31st St., Milwaukee 46, Wis. The Type R (reciprocating) master valve unit embodies a slide valve linked to a balanced piston with line pressure maintained on the inside, as well as on both ends of the piston.

The Type AR (air return) master valve unit also embodies a slide valve but linked to an unbalanced piston. The inside of the piston is under constant pressure, and the piston is shifted by admitting pressure to the large end through the energization of a three-way normally-closed solenoid pi-



"Nopak" Model "V" Type R Pilot-Operated Four-Way Slide Valve

lot valve. The Type R is available in  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ , and 1-inch pipe sizes, and the Type AR is available in  $\frac{1}{4}$ ,  $\frac{3}{8}$ , and  $\frac{1}{2}$ -inch pipe sizes.

### High-Low Hydraulic Power Unit Is Compactly Made

Designated as "Hydrau - Power - Pak," a compact high-low hydraulic power unit which features "Unitrol,"

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**In the General Electric Plant**  
*Magni-Focuser helps a worker make adjustments on precision equipment.*

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matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

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**SPEEDS PRODUCTION**

**Leaves both hands free to work**

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Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

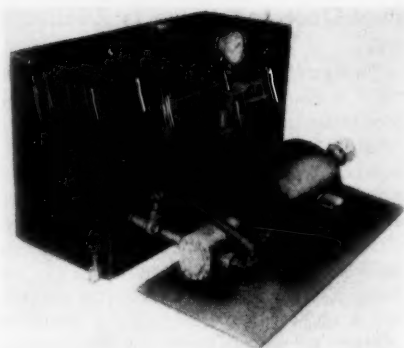
Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

**Send for descriptive folder**

**EDROY PRODUCTS CO.** 480 Lexington Ave.,  
Dept. P, New York 17, N. Y.



a feature that is said to eliminate piping, screwed connections, unnecessary valves, and to permit the repair or replacement of valves with minimum down time, has been announced by Clifton Hydraulic Press Co., 299 Allwood Rd., Clifton, N. J. The unit, with a solenoid-controlled operating valve for automatic presses as optional equipment, is available in capacities from 5 to 50 g.p.m. on the low pressure side, from  $\frac{1}{2}$  to 6 g.p.m. on the high



Clifton "Hydrau-Power-Pak" High-Low Hydraulic Power Unit



**T-NUTS**  
**STUD SETS**  
**STRAP CLAMPS**

**SURE GRIP STEP BLOCKS**

**TIETZMANN TOOL CORP.**  
ENGLEWOOD, OHIO

pressure side, and with pressures up to 10,000 pounds per square inch.

The reservoir is sturdily constructed of welded steel. A relief valve, check valve, reservoir filter, air breather filter, and large easy-to-read dial are supplied as standard equipment.

**EISLER CAM MILLING**  
**JIG BORING**

**A SPECIALIZED CAM**  
**MILLING SERVICE...**  
**JIG BORING...SPOT**  
**WELDING...CON-**  
**TRACT PRODUCTION**  
**...EXPERIMENTAL DEVELOPMENT**

**EISLER ENGINEERING CO., Inc.**  
734 So. 13th St. Newark 3, N. J.

### Welding Preheat and Interpass Temperature Calculator

To quickly determine preheat temperature required when welding hardenable steels, a calculator using the slide rule principle has been reissued and brought up to date by The Lincoln Electric Co., Cleveland 17, Ohio. Durable construction with easy-to-read figures, the instrument calculates pre-



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For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters  $\frac{3}{8}$ " to 4" ... 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.



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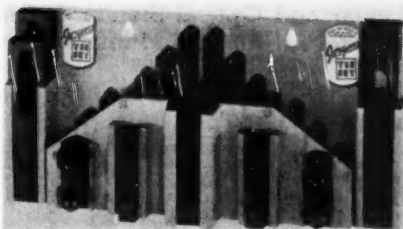
349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

heat in simple steps based on chemical analysis and thickness of steel. The calculator serves as a guide to correct procedure which is based on factual information rather than rule of thumb guessing. The percentage present of elements, such as carbon, manganese, silicon, phosphorus chromium, nickel, copper, molybdenum, and vanadium, is worked into the calculation along with metal thickness ranging from  $\frac{1}{2}$  to 10 inches.

The price of the calculator is 50 cents in the U. S. A. and 75 cents elsewhere.

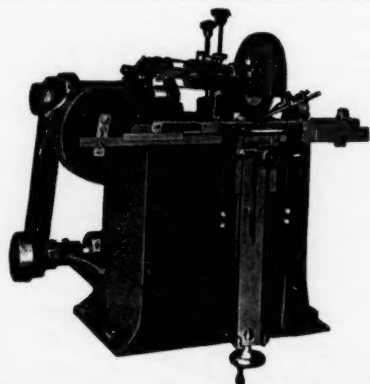
### Machine Set-Up Kit

For setting up milling machines, jig borers, boring mills, gear cutting machines, drill presses, and so on, Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10, Ohio, has announced a set-up kit which contains 24 studs; 4 extension nut couplers; 4 flange nuts;



Jergens Machine Set-Up Kit

4 T-slot nuts; and 4 strap clamps with available stud diameters of  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ , and  $\frac{3}{4}$  inch and with three different T-slot nut sizes available for each stud diameter. The various items are packaged in a heavy gauge steel kit holder with baked enamel finish and wooden inserts to hold studs in position. The kit is designed so that it can be hung on a wall or set on a table close to the machine. All parts are of heat-treated alloy steel with black Pentrate finish.



**Wardwell Model EC Combination Grinder**  
The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. • This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

## sharpening 1 gross of hack saw blades **PAYS** for this machine!

One gross of hack saw blades can be resharpened at least 6 times—actually saving you the price of the machine!

Wardwell EC Grinder gives old blades a keener, longer lasting cutting edge—because new blades are usually not ground after hardening.

Wardwell EC wheels will not burn, anneal or injure hardness of teeth. Sharpen Circular, Hack or Band Saw blades on one machine!

### WRITE FOR BULLETIN EC TODAY

Complete Wardwell Catalog describing more than 30 grinding, sharpening, setting and swaging machines also available.

# THE WARDWELL

# MANUFACTURING CO.

3166 Fulton Rd., Cleveland 9, Ohio

## Linear and Optical Standards Set Checks All Aspects of Micrometer Accuracy

A micrometer checking set designed for checking 1 and 2-inch micrometers has been announced by The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. The set includes three gage blocks, 0.2500, 0.6500, and 1.000 inch respectively, which are used individually or in combination for checking the accu-



Checking calibration of a micrometer with a gage block—part of DoAll Micrometer Checking Set

# CAMS

MADE TO YOUR SPECIFICATIONS

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YOUR CAM PROBLEMS

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PATENTED  
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- SQUARE BLADES Easily Replaced.
- Simple, Accurate Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



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MACHINE WORKS

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**HARDENED and GROUND HSS BLANKS**  
Any decimal diameter to 1/8" — in any length.  
Mirror finish surface to gage tolerance. Many uses — punches, gages, measuring wires, special tools, etc. Quick delivery.

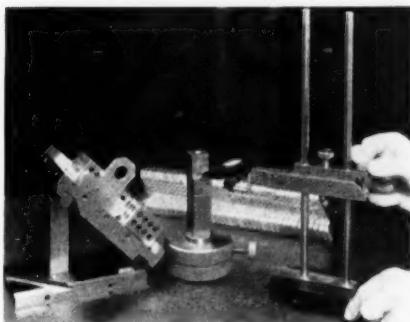
Write for price list D-2  
**WILLIAM T. HUTCHINSON COMPANY**  
235 Main St. Orange, N. J.

### Indicator Height Gage and Adjustable Inspection Block for Fast, Accurate Inspection

An indicator height gage and an adjustable inspection block which are said to provide for fast, accurate, precision inspection and layout work have been developed by Tietzmann Tool Corp., Englewood, Ohio. The indicator height gage, set to master parts or standard gage blocks, is a precision instrument which can be quickly adjusted to approximate height and positively locked in place. Final adjustments, it is claimed, can be made in millionths of an inch by means of an adjusting screw.

The inspection block is adjustable in millionths of an inch through a range of 0.250 inch vertically. The block utilizes a 1 $\frac{3}{4}$ -inch diameter anvil which can be quickly raised or lowered by means of a micrometer thread knurled thumbscrew. Top and bottom

surfaces of the block and the surface of the anvil are ground and lapped to assure accuracy. The height gage is



Tietzmann Indicator Height Gage and Adjustable Inspection Block in use

supplied with an indicator holder and scribing attachment and is available in three sizes which are 12, 24, and 36 inches in height.

## Notch 750 Pipe Ends per Hour

with **ARC-FIT**  
REG. U. S. PAT. OFF.

**CLEAN NOTCHES  
NO EXTRA FINISHING  
NO DEFORMATION**

Standard ARC-FITS notch  $\frac{1}{2}$ " to 2" pipe for "T" joints. Dies for each size. Immediate shipment.

Special ARC-FITS for angular cuts or larger sizes. Send drawing and material specification for quotation.

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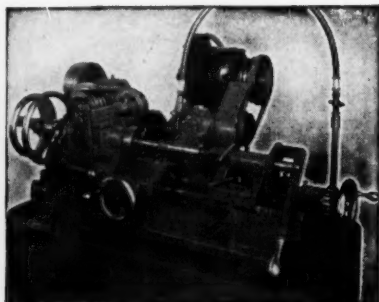


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Standard Arc-Fit  
works well in  
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### THREAD MILLING MACHINE

Also Pinion and Gear Cutting Machines, Cylindrical Sub-Presses, Cutter Sharpening Machines, Small Special Machinery. Cutters for thread milling and gear cutting.

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**WALTHAM MACHINE WORKS**  
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- Simple Operation
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- Uniform Depth

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 1806 W. BELLE PLAINE AVE.  
CHICAGO • 13 • ILLINOIS

## Parts Handling Equipment Is Designed for Mass Production Operations

A complete line of equipment for parts handling and storage which is designed for mass production operations is now being produced by Bathey Mfg. Co., 159 S. Mill St., Plymouth, Mich. The equipment includes standardized pressed-metal pallets, tote pans and tote pan adapters, and small parts bins which may be assembled without tools into infinite arrangements to suit



Bench setup using Bathey Parts Handling Equipment

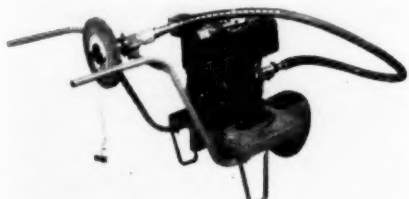
current production and assembly requirements.

According to the manufacturer, benches may be assembled using tote pan adapters and tote pans as a base. Bench bin frames and bins are said to keep parts within easy reach of the worker.

The bench bins, it is claimed, segregate from 30 to 126 different parts while the floor-type bins accommodate up to 360 parts. Construction of the equipment is of heavy-gauge sheet metal, finished in one of three different industrial enamels.

## Mobile Grinder Is Powered by a Gasoline Engine

The Franklin Balmar Corp., N. A. Strand Division, Woodberry, Baltimore 11, Md., has introduced a gaso-



Strand Model DGX-7 Gasoline Engine Powered Flexible Shaft Grinder

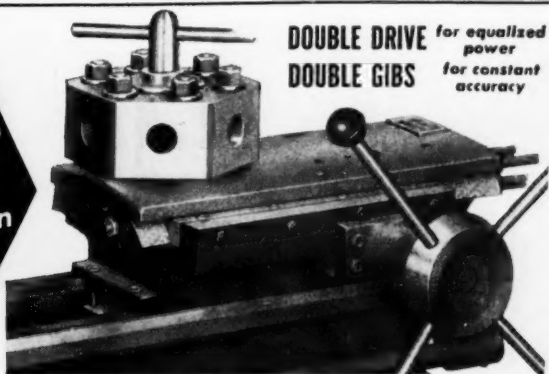
line engine powered flexible shaft grinder, designated as the Model DGX-7, which is designed to eliminate the need for air compressors and is

intended for use where electric power is not available for grinding, rotary filing, and other cutting or finishing operations.

The unit consists of a 5-h.p. gasoline engine mounted on a wheelbarrow-type truck. A 7-foot flexible shaft is attached directly to the shaft of the motor. A  $\frac{3}{4}$ -inch capacity arbor-style hand spindle at the end of the shaft is said to accommodate any conventional flexible shaft tool and grinding wheels up to 10 x 1½ inches.

The engine is mounted on the platform by means of a swiveled base. The base, it is claimed, moves a full 180 degrees, thus allowing use of the shaft in any direction. The swivel plate locks in five different operating positions. According to the manufacturer, the unit can also be used as a fixed bench tool.

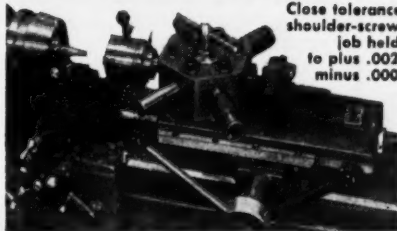
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Self-Indexing  
**HEXTURRET**  
For Lower Production  
Costs and Speedier  
Output



- ✓ Custom built to fit all lathes from 9" to 18".
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- ✓ All bearing surfaces hand scraped.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the country.  
Send for Catalog No. 53.



**ENCO Manufacturing Co., Dept. 183**

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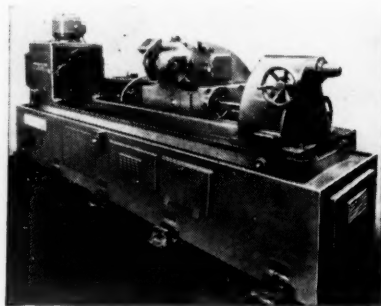
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## Machine Is Designed for Shaving Gear Tooth Profiles of Large Turbine Pinions

Designed for shaving gear tooth profiles of large turbine pinions where close tolerances and high-quality finish are required, the David Brown-Muir S24H Horizontal Gear Shaving

Machine, which is said to be capable of shaving pinions of from 4 to 24 inches in diameter and up to 100 inches long,



David Brown-Muir S24H Horizontal Gear Shaving Machine

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



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**NIELSEN TOOL &  
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# Columbia

**TOOL STEELS** for  
all tools for all purposes



**HOT WORK-  
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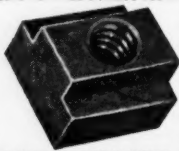
**COLUMBIA TOOL  
STEEL COMPANY**

Main Office & Works  
Chicago Heights 6, Ill.

is now being marketed by Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y. The machine weighs 20 tons and is designed for shaving by the radial loading method, whereby both flanks of the gear tooth are cut simultaneously.

Independent driving units for both the work driving head and cutter saddle traverse are provided. The work drive head, designed as a self-contained unit, is fixed to the bed and powered by a constant-speed 5-h.p. motor, providing a choice of spindle speeds ranging from 21 to 300 revolutions per minute.

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DOUBLE END JIG FEET  
SCREW TYPE JIG FEET  
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ADJUSTABLE STEP BLOCKS  
STAR TYPE HAND KNOBS  
HEXAGON TYPE HAND KNOBS  
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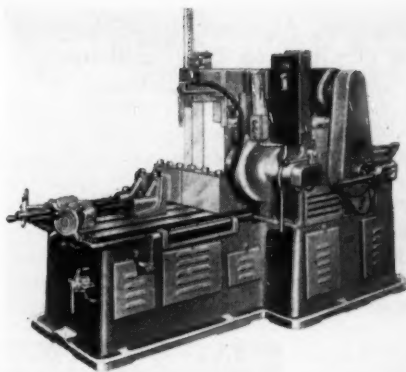
**Northwestern**

119 HOLLIER AVE., DAYTON 3, OHIO

### Improved Hydraulic Hack Saw Machine Has Many New Features

Peerless Machine Co., 1600 Junction Ave., Racine, Wis., has announced several improvements in its extra heavy-duty hydraulic hack saw machine, including a larger hydraulic pump, improved feed piston and piston ring design, and improved timing of the cam action to effect precision timing in bringing the saw blade in and out of the work. The feed pressure is said to be smoothly and accurately applied through an improved hydraulic system with the saw blade operating vertically and having an improved larger lift on the relief or non-cutting stroke. With the saw blade operating vertically and with a steady flow of coolant applied from the top, all chips are quickly washed into the chip tray.

All slide bearings of the machine are now lined with hardened and ground removable-type inserts and re-



Peerless Improved Vertical Extra Heavy-Duty Hydraulic Hack Saw Machine

placeable heat-treated shoes. Revolving heavy-load bearings are of the ball or roller anti-friction type. An air cylinder counterbalances or offsets the weight of the saw frame in its reciprocating motion.

# MARSHALLTOWN



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## OPEN BACK INCLINABLE PUNCH PRESSES

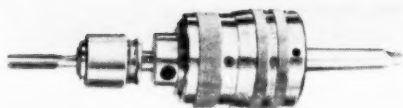
Soundly Engineered — Ruggedly Built for  
**PRECISION & ECONOMY**

- All bearings honed to exact sizes, guaranteeing perfect fit and alignment.
- Matched unit slide and gibs pre-finished by precision lapping with newly developed process.
- Chrome molybdenum cranks, wrist pin connections.
- Easy to maintain — economical to operate.
- 5 to 70 tons capacity.
- 9 models.

**MARSHALLTOWN MFG. CO.**  
MARSHALLTOWN, IOWA

## Tapping Attachment Is Designed to Reduce Tap Breakage

Homstrand, Inc., Larchmont, N. Y., is now distributing the GNG Tapping Attachment which is particularly designed to reduce tap breakage. Torque is transmitted through a sensitive disc clutch, and accurate control is said to be obtained by simply turning the sleeve in either direction. The sleeve is also graduated so that the operator can set the required torque



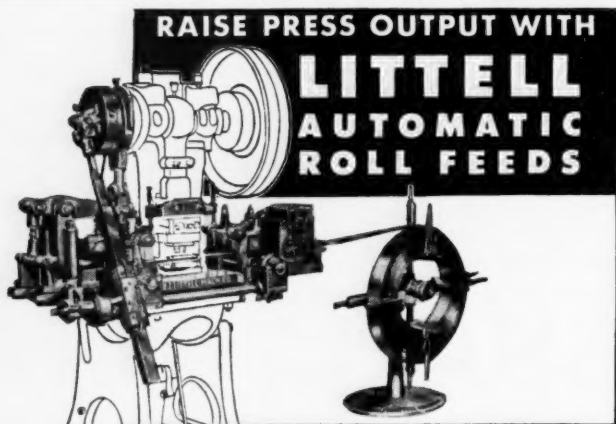
GNG Tapping Attachment

instantly in those cases where consecutive tapping of various size holes is required.

The attachment is equipped with a quick-change chuck and is supplied, as standard, with a No. 2 Morse taper; however, other tapers are available on order. Tap holders from 5/32 through 1/8 inch can be furnished. The attachment is supplied complete with a polished mahogany case.

## Tapping Lubricant

Designed for tough metal tapping operations, a lubricant known as "Vantrol," which is said to be based on unique polarity characteristics that resist wiping action and provide unusual carry-through, has been announced by Van Straaten Chemical Co., 546 W. Washington Blvd., Chicago 6, Ill. The tapping lubricant is available in two types; namely, Vantrol 5510A



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old or new  
equipment

Write for  
catalog

Press room output can often be multiplied five times by the simple addition of Littell Automatic Feeds to present equipment. The typical Littell Double Roll Feed shown here grips the stock on both sides of the die to assure maximum traction and feeding power. Stock is easier to start and finish in progressive die work. No hand feeding at either end of the stock. Rack and pinion drive provides the smoothness and the gradual acceleration and deceleration of feed rolls for a truly accurate feed. Standard Littell Automatic Feeds serve all types and sizes of presses, all standard widths and thicknesses of stock.



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with Safety

F. J.

MACHINE  
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ROLL FEEDS • DIAL FEEDS  
STRAIGHTENING MACHINES  
REELS • AIR BLAST VALVES

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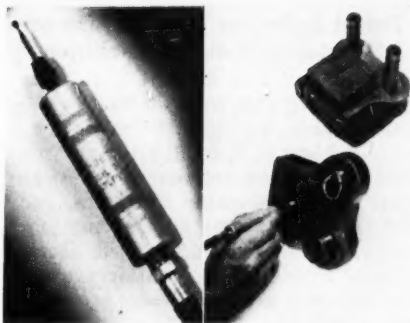
4163 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

WHEN YOU BUY FROM LITTELL... YOU  
PURCHASE A PACKAGE OF SATISFACTION

which is specifically designed for heavy tapping, has a viscosity heavy enough for brush-on application, and can be removed by ordinary cleaning; and Vantrol 5510B which has extreme pressure qualities, assures carry-in through its wetting action, and can be easily removed after tapping.

### Die Grinder Develops Speeds up to 110,000 R.P.M.

A small lightweight pencil grinder which is said to develop speeds up to 110,000 r.p.m., which is air driven, and which will operate on pressures of 50 lb. or more is being marketed by Nu-Jett Products, 1335 Michigan N.E., Grand Rapids, Mich. Useful in die-making, fine etching, polishing, finishing, and other operations, the grinder utilizes the principle of opposed spirals, which run the full length of the barrel and rotor. The only moving parts are



(Right) Nu-Jett Pencil Grinder. (Left) Nu-Jett Pencil Grinder being used to polish a die

the rotor and two ball bearings. Exhaust air from the grinder is ejected out the front end, thus keeping dust constantly blown away from the work.

Weighing 4 oz., the grinder is supplied complete with a chuck wrench, control valve, air filter, and 6 feet of air hose.

## LAST WORD WHEEL DRESSERS Simplify the Job!

### PRECISION ANGLE TANGENT TO RADIUS WHEEL DRESSING

- Dresses grinding wheel at point of contact.
- Shortens dressing time.
- Simplicity of setting.
- Rugged for long life.

Also Distributors of  
**SAMSON**  
OFFSET  
BORING CHUCKS



Above: These and countless other forms may be dressed simply with the Last Word Wheel Dresser. Write for Catalog

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18500 MT. ELLIOTT • DETROIT 34, MICHIGAN

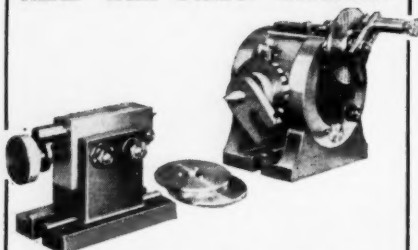
### Turret Indexing Unit for Use on Special Automatic Machines

A standard intermittent-motion turret indexing unit which is said to provide a basic "packaged" chassis for a wide variety of special automatic machines has been announced by Swanson Tool & Machine Products, Inc., Erie, Pa. According to the manufacturer, harmonious indexing is accomplished by means of a uniform acceleration cross-over cam, and a locking



Swanson Turret Indexing Unit

### 10"-12" UNIVERSAL DIVIDING HEAD with DIRECT INDEXING



Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 6" size and in 10"-12" spiral drive.

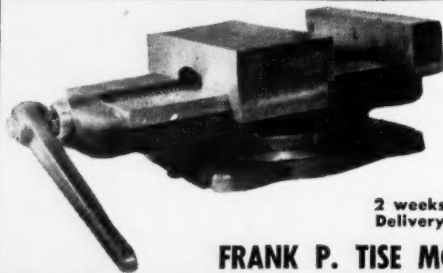
WRITE FOR FOLDER

### CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati, Ohio

device assures positive and accurate location at all work stations. A mounting ring with a radial keyway is provided for fastening mounting brackets, and a stationary center plate is said to provide an additional means of mounting or supporting operational devices.

The unit is offered with turret diameters of 20, 30, or 40 inches for mounting 16, 24, or 32 work stations. Indexing rates are from 547 to 4,700 indexes per hour, and dwell time may vary from 0.5 to 4.9 seconds.



2 weeks  
Delivery

### Graduated Swivel Vise for Shapers

11½" jaw width, 2½" jaw depth. 13½" vise opening. Base, 12" x 14". Keys are 11/16" or made to your specifications. Holes for tee slot bolts made to order.

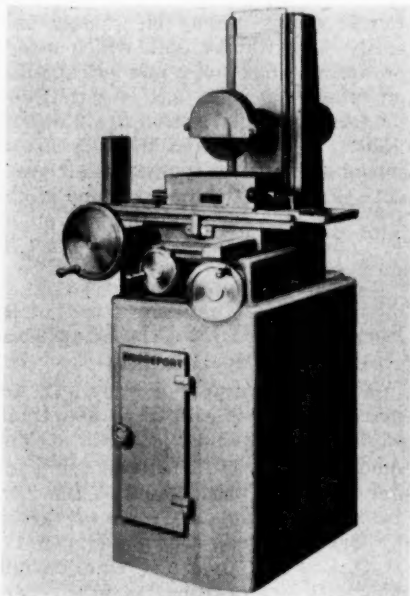
\$262.50 F.O.B. Kansas City

FRANK P. TISE MCHRY. CO.

1246 SWIFT AVE.  
NO. KANSAS CITY, MO.

## Surface Grinder Has 13-Inch Clearance under the Wheel

Bridgeport Grinding Machine Co., 315 Asylum St., Bridgeport, Conn., has announced a surface grinder, designated as the "Surf-Ace," which has a 13-inch clearance under the wheel and a 6 x 12-inch table. The machine can be supplied with either a Pope, Ex-Cell-O, or Whitnion anti-friction ball and roll-



Bridgeport "Surf-Ace" Grinder

er bearing spindle. According to the manufacturer, the machine is hand scraped, well guarded against dust, and incorporates vee and flat ways.

Designed to accommodate a standard 7 x 1/2 x 1 1/4-inch wheel, the grinder utilizes a vertical and transverse handwheel, both of which are graduated in 0.001-inch increments. Standard equipment includes a complete motor and switch, grinding wheel, wheel adapter, and necessary wrenches.

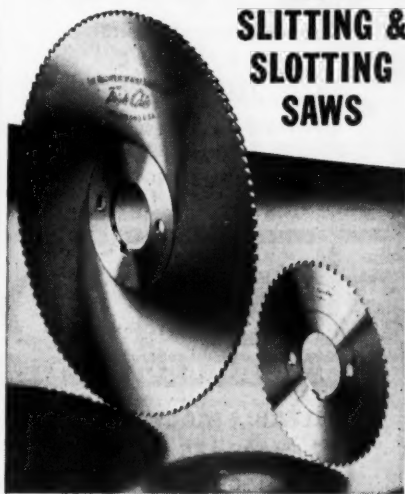
August, 1953

# NO CLOGGING — NO BINDING —

with **MOTCH & MERRYWEATHER**



## SLITTING & SLOTTING SAWS



The Motch & Merryweather Triple-Chip Method clears the way to faster results in milling operations. Alternately ground paired high and low blade teeth form curling, self-clearing chips which relieve stresses and minimize breakage. Saws produce more work and more accurate work and "live longer".

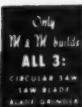
\* \* \*

THE MOTCH & MERRYWEATHER MACHINERY CO.

715 PENTON BUILDING  
CLEVELAND 13, OHIO



REMEMBER — IT'S THE COST  
PER CUT THAT COUNTS!

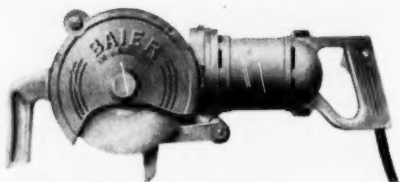


MODERN MACHINE SHOP 329



## Portable Saw Permits Fabrication of Metal Parts on the Job

Introduced by Alina Corp., 401 Broadway, New York 13, N. Y. is the "Baier" Electric Metal Cutting Hand Saw, which is designed to cut bar, angle, sheet, and other shapes of metal stock right on the job. The unit utilizes a high alloy steel blade and is capable of cutting 2 or 3-inch bar stock, de-



"Baier" Electric Metal Cutting Hand Saw

pending upon the size of the saw used. Materials having an extremely high tensile strength may be quickly and easily cut with the unit, which incorporates a  $\frac{1}{3}$  h.p. motor and will operate on either 110 volts, a.c. or d.c. Other models are available to operate on 220 volts, a.c. or d.c., and there is also a model available to operate on air pressure. Various attachments may be obtained to efficiently handle sheet metal or to properly control various types of miter cutting.

## JIG BORING

Done to your specifications

WE HAVE

12 JIG BORERS

Including the largest

PRATT & WHITNEY Made

BLOOMFIELD TOOL CORPORATION

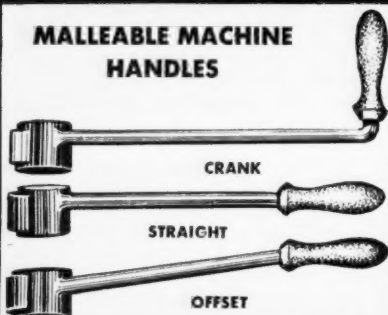
37 FARRAND ST.

BLOOMFIELD, N. J.

## REID

TOOL ROOM ACCESSORIES

### MALLEABLE MACHINE HANDLES



Finest and most complete available. Made in 3 styles and in a large variety of sizes. Well proportioned. Neat in appearance. Smooth finish. Stands up under severe usage. Low prices. ALSO plastic and steel ball handles. C.I. hand knobs, compression springs, etc. Finest quality. Low prices.

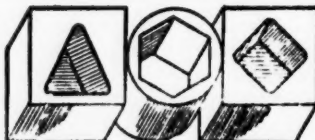
**FREE  
NEW 44 Pg.  
CAT.**

REID TOOL SUPPLY CO.

Muskegon Heights, Michigan

## Portable Air Grinder Is Adaptable to Die Grinding

A general-purpose portable air grinder which is said to be adaptable to die grinding and which will accommodate rotary files, cutters, and mid-get mills has been added to the "A" Series of portable air tools marketed by Buckeye Tools Corp., Division 17, P. O. Box 966, Dayton 1, Ohio. Available with lock button or lever throttle, the grinder will accommodate a 2-inch

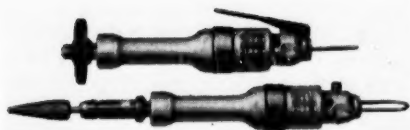


### DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS  
Wilmerding, Pa.



(Above) Buckeye "A" Series General-Purpose Portable Air Grinder with lever throttle.  
(Below) Grinder with lock button throttle and adapted for die grinding.

organic wheel and is offered with an extension adapter for using mounted wheels. The tool weighs 1 $\frac{3}{4}$  lb. and features a one-piece shaft design. The rotor is said to "float" on the shaft, connected by two keys which can be quickly and easily replaced when worn.

### End Mills Available in Long, Extra Long, and Small-Diameter Sizes

Goddard & Goddard Co., P. O. Box 68, Brightmoor Station, Detroit 23, Mich., has announced the addition of seven styles, including long, extra long, and small-diameter sizes, to its standard line of end mills. With the new styles, 149 stock end mills can be supplied in diameters from  $\frac{1}{16}$  to 2 inches, providing a complete range of sizes as established by the Metal Cutting Tool Institute. In addition, three styles of heavy-duty end mills with 2-inch shanks are also available.

The main design of the end mills is based on the "Hi-Lix" principle—high helix and curved undercut on the tooth face — providing maximum effective shear along with long tool life.

Goddard & Goddard End Mills



**Cut accidents —  
Increase man hour  
production  
with a . . . . .**

Handles heavy dies from storage rack to press. Lifts barrels, boxes, loads trucks, makes a handy adjustable shop table. Automatic brake holds load at any height.

**Type D** — Hand operated  
CAP. 500 lbs.....\$183.60

**Type DE** — Electric operated  
CAP. 500 lbs.....\$412.08

**Type DX** — Hand operated  
CAP. 1000 lbs.....\$349.52

**Type DX** — Hand operated  
CAP. 2000 lbs.....\$417.52

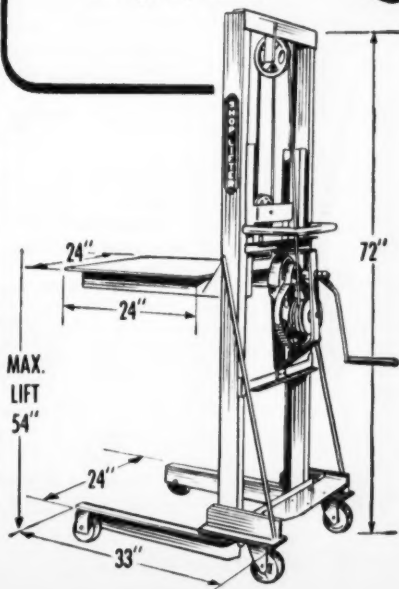
Floor lock included.

Prices net F.O.B. Chicago

**ECONOMY  
ENGINEERING COMPANY**

4507 West Lake Street  
Chicago 24, Illinois

**SHOP-LIFTER**





Nelco Slitting Saw

### Slitting Saw

Nelco Tool Co., Inc., Manchester, Conn., has announced a slitting saw which features a heavily reinforced body to minimize shearing during stresses and to prevent shattering at high operating speeds. The body of the

saw is built out to the width of the teeth, and the unique Nelco design feature of overhanging carbide tips is also utilized. Quick, free chip removal is said to be afforded by full side chip clearance. The saw, it is claimed, has an accurately ground hub and precision honed hole. The saw is color coded for ease of identification by an electroplating process. The color coating is said to protect the cutter body and prevent rust.

## Perfect Balance

Each of the elements in a Curtis Joint is precisely proportioned in dimensions, heat treatment and steel composition to provide balanced performance.

## CURTIS UNIVERSAL JOINTS



One advantage of this integrated balance is demonstrated in laboratory tests which prove that Curtis standard stock universal joints — although not specifically intended for high speed application — perform successfully at speeds up to 3,000 or 4,000 r.p.m.

### ONLY CURTIS OFFERS ALL THESE ADVANTAGES

**Availability** — 14 sizes always in stock; bored or unbored hubs. 6" hub diameter joints or special machining to specifications.

**Simplicity** — fewer parts, simpler construction.

**Government Tests** — complete equipment for government tests in our plant.

*Not sold through distributors; write direct for free engineering data and price list.*

### CURTIS UNIVERSAL JOINT CO., INC.

10 Birnie Ave., Springfield, Mass.

As near to you as your telephone

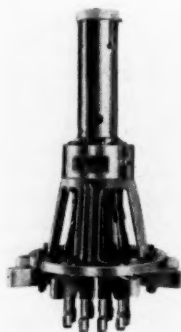
Not sold through distributors



Trade Mark **A MANUFACTURER OF UNIVERSAL JOINTS SINCE 1919**

### Tapping Head

Errington Mechanical Laboratory, Inc., Staten Island 4, N. Y., has announced the Errington



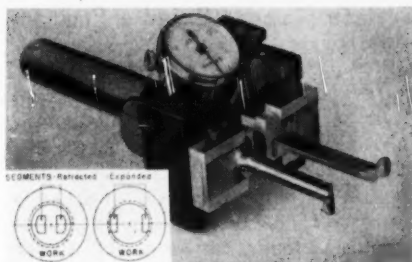
Errington Universal Joint Adjustable Auto Reverse Tapping Head

Universal Joint Adjustable Auto Reverse Tapping Head with the reverse built right in the head. Designed to tap two, three, or four holes in any pattern from 11/16-

inch centers to within a  $5\frac{1}{4}$ -inch diameter circle for tapping 0 to  $\frac{1}{4}$  inch, the head is of rugged construction with aluminum castings. Gears, spindles, and shafts are one piece, hardened and ground. The head is equipped with ball thrust bearings at all thrust points, as well as Oilite radial bearings.

### Portable Gage Checks Diameter and Roundness of Internal Grooves

Designated as the Model P-11, a portable groove gage which is designed for checking the diameter and roundness of internal grooves has been announced by Bryant Chucking Grinder Co., Springfield, Vt. The gage is said to cover a range of groove diameters up to 5 inches and will check grooves which are located to a depth up to 1 or 2 inches from a face, depending on the diameter of the groove. The gage segments are cast Stellite and are held

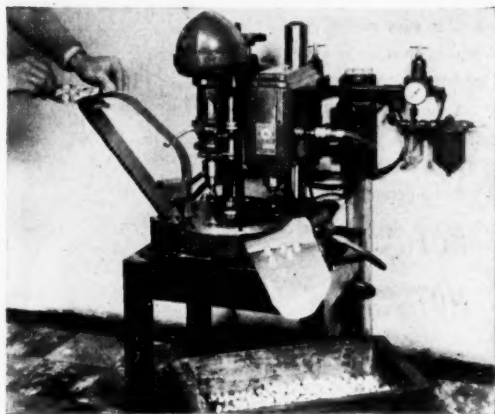


Bryant Model P-11 Portable Groove Gage

firmly in place by a dovetail clamp. The segments may be adjusted to cover a range of groove diameters by simply loosening the clamp and spacing them to the required diameter.

Four pairs of groove segments will cover standard O-ring grooves from  $\frac{7}{8}$  to  $4\frac{7}{8}$  inches in diameter, and four different pairs of segments cover standard snap-ring grooves from  $\frac{1}{4}$  to  $5\frac{1}{4}$  inches in diameter.

## CHAMFERING AND MARKING



### 6,000 Nuts Per Hour!

A standard Automark Marking Machine combined with a Drill Press and Automark Dial Feed Fixture enabled this manufacturer to chamfer and mark 6,000 nuts per hour . . . all automatically.

For a variety of branding, staking, assembling, and marking operations investigate the Automark Marking Machine—it is versatile and fast, marking up to 15,000 parts per hour.

From the smallest to the largest requirements, we are equipped to deliver promptly, quality marking equipment. Let us quote on your marking needs.

*Imperial* STAMP & ENGRAVING CO., INC.

4458 N. WESTERN AVE. *Chicago* 25, ILL. • CORNELIA 7-5882

## Surface Grinder Spindle Permits Finishes up to 2½ to 4 Microinches

A precision surface grinder spindle which is said to permit finishes up to 2½ to 4 microinches has been announced by Whitton Mfg. Co., 217 High St., New Britain, Conn. According to the manufacturer, spring preloading keeps the wheel chatter-free under radial and axial loads, and rigidity allows the wheel to spark out fast. The spindle assembly, it is claimed, is accurate-

ly balanced on its own precision ball bearings. A self-adjusting feature of



Whitton Surface Grinder Spindle

the spindle is said to afford a high degree of finish.

**"M-40-U"**  
**ALLOY CENTERS**

**Give You PRODUCTION-PROVEN  
"DEEP CORE DESIGN"**

Get more for your center dollar with Gorham "DEEP CORE DESIGN!" "M-40-U" Alloy Centers are PRODUCTION-PROVEN in the largest plants. They consistently outlast high-speed and other alloy centers, stand far more abuse. Although equal to carbide in wear resistance, they cost less, are easier to redress.

And Gorham's exclusive "DEEP CORE DESIGN" allows many more redressings, too! A core of "M-40-U" Alloy, developed by Gorham expressly for wear, abrasion and heat resistance, is induction brazed deep in the shank, after which the entire center is finish ground, giving you wear material permanently supported by tough shank steel!

Gorham "M-40-U" Alloy Centers are available with Morse, B. & S. or Jarno taper shanks. Immediate delivery on popular sizes, "specials" to specification. Free literature gives description, dimensions, prices. Send for your copy today.



**"DEEP CORE DESIGN"**

**Gorham TOOL COMPANY**

**"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"**

14414 WOODROW WILSON • DETROIT 3, MICHIGAN  
WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif



## Button Head Cap Screw

The Allen Mfg. Co., 125 Shelton St., Hartford 2, Conn., has announced a button head cap screw



Allen Button Head Cap Screws

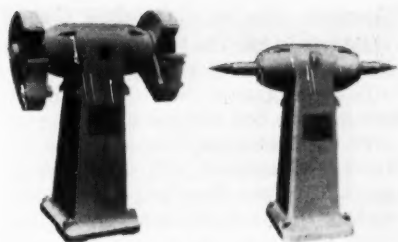
which is said to provide smooth, streamlined surfaces that are desirable in many applications where counter-sinking is not permitted. The screw, it is claimed, has a rounded top and flush edges

which prevent exposed sides, thus eliminating the hazard of catching on clothing. The screw is shallower than a standard socket screw. The screw body is cold-worked and the socket head is cold-drawn to impart strength to the metal.

The button head cap screw is available in sizes ranging from No. 8 x 1/4 inch through 5/8 x 2 inches standard with N. C. threads. These sizes are also standard with N. F. threads, except in 1/2 and 5/8-inch diameters.

### Grinding and Polishing Machines Have Sturdy, Solid Construction

Newage International, Inc., 235 E. 42nd St., New York 17, N. Y., has introduced the Stamford line of grinders and polishers which feature extra sturdy, solid construction. According to the manufacturer, the motors are specially designed for the machines and are provided with extra large shafts



(Right) Stamford Grinder. (Left) Stamford Polisher

to accommodate all kinds of loads and yet assure smooth, vibrationless operation. Heavy-duty bearings are utilized, and the machines are said to afford adequate room for two operators to work simultaneously.

Electrically, all slots are lined with high-quality insulation and synthetic enamel wire. The starters are of the inset type with no volt and three overload releases.



### "MULTI-INSULATION"

*is the secret of . . .*

## HUPPERT FLOOR MODEL FURNACE

This sturdy, production-type Huppert Furnace not only attains highest-level efficiency, but cuts operating costs to a minimum through unique Huppert method of multi-insulation surrounding all sides of the work chamber. This furnace provides a versatile heat range—continuous up to 1850° F., intermittent to 1950° F. Also built for 2300° F. for special applications.

*This model built in 20 different sizes. Model No. 16 illustrated, 12" x 8" x 18" \$925.00 complete*

Automatic temperature control featured. Also tight-sealing, wedge-type door and convenient shelf. 220 V. AC, single or 3-phase operation (110 V. or 440 V. models to order).

## K. H. HUPPERT COMPANY

6841 Cottage Grove Avenue, Chicago 37, Illinois  
Manufacturers of Electric Furnaces and Ovens



## Machine Marks Cartridge Cases

Designated as the "Noblewest" Model No. 353, a roll marking machine for rolling permanent identification data into the top flat surface of large cartridge cases has been developed by The Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn. According to the manufacturer, the machine will accommodate cases up to the 105 mm. shell size, made of either

brass or steel. The machine is entirely air operated with an air-powered work slide and die slide. Both air cylinders are controlled by a single foot pedal or push button. Sequencing is said to be automatic and requires no adjustment.

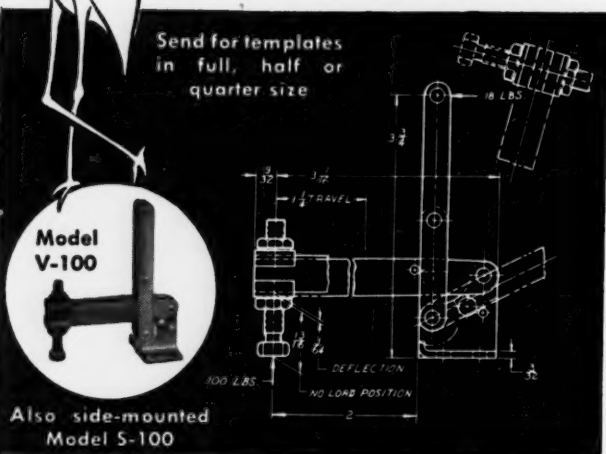
A combination air-control unit, consisting of pressure regulator, gage, air line filter, and lubricator, is furnished with the machine. The pressure regulator sets the required pressure

for the depth of mark, and the filter removes foreign particles

## ANNOUNCING **Our New Baby** A **MIDGET CLAMP**

UNBELIEVABLY STRONG, WITH PERFECT FEATURES  
100 lbs. clamping force with spindle at end of toggle bar!

Send for templates  
in full, half or  
quarter size



Also side-mounted  
Model S-100

**KNU-VISE  
PRODUCTS**

**LAPEER MFG. CO.**

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Sales offices in principal cities

WESTERN DIVISION—422 MAGNOLIA  
CANADIAN DIVISION—HIGGINSON ENGR.

• GLENDALE, CALIF.  
• HAMILTON, ONT.



"Noblewest" Model  
No. 353 Cartridge  
Case Marking Machine

from the air lines to protect valves and cylinders. The lubricator provides a thin fog of oil to lubricate the pneumatic components. The machine occupies a floor space of 28 x 30 inches and weighs slightly less than 1,000 pounds.

## Sawing Attachment Has 360-Degree Rotability

Designed for use with any 1/4-inch heavy-duty electric or air drill or motor-driven flexible shaft, a sawing attachment, designated as the "Key-



"Key-Hak" Sawing Attachment used with portable-electric drill

Hak," which is said to have 360-degree rotability has been announced by Producers & Distributors, Inc., 714 S. Sixth St., Allentown, Pa. The attachment is said to be designed to cut directly, without the aid of a starting hole, into 20-gauge or lighter sheet metal, as well as into wood of any

thickness. The mechanism is sealed in a lubricant to assure protection, and three ball bearings used in the drive and crank mechanism provide smooth operation.

Special saw blades are available for cutting stainless steel, Monel, Chromoly, and chrome vanadium. Other blades designed for cutting bronze, copper, aluminum, zinc, and lead are also available.

## Hole Locating Device Provides Accuracy in Production Drilling

Designated as the "Production Master," a hole locating device which is said to be engineered for high-standard accuracy in production drilling has been announced by Honnet Engineering Co., Wethersfield, Conn. Designed for jig drilling, reaming, and boring, the unit will accommodate work up to 6 3/4 inches x 10 inches x the height permitted by the drill press.

**Drill More Holes Per Hour  
In ANY Pattern...  
On ANY Drill Press**

*Adjustable*  
**with a MULTI-DRILL**

Increase production up to 800%... save time, cut costs. MULTI-DRILLS make any drill press produce more. Attached without alterations or special tools. Quick, easy setups of universally adjustable spindles give you more flexibility... wider application. Handles any hole pattern within 9" circle; centers close as 1/2". Extension Spindles available to increase working area to 22 1/2". Special adaptations available.

**DRILLS ANY  
HOLE PATTERN**



**COMMANDER MFG. CO.**

4224 W. Kinzie St.

Chicago 24, Illinois

**Product of Commander... Builder of Production Tools**



**Drills 2  
to 8 holes  
at one  
stroke**

*model  
900*

See your Commander Distributor for complete details. Write for the NEW Commander Full Line Catalog No. 851.

**KIPP**  
*Air Grinders*



- **FASTER SPEEDS**
- **BETTER RESULTS**
- **LOW PRICES**

**MODEL JA**  
**50,000 R.P.M.**  
Weight 12 ounces; length 6 3/4 inches; chuck size 1/8 inch. Wheel guard removed for better illustration.

**\$42**  
IN U.S.A.

## THEY GRIND—NOT JUST RUB!

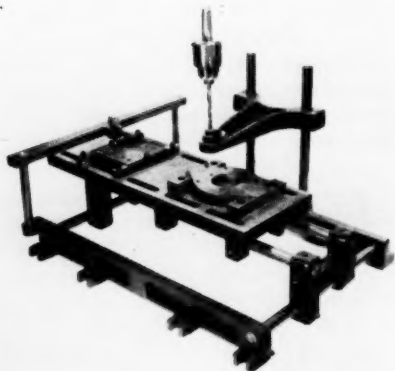
The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

## MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006



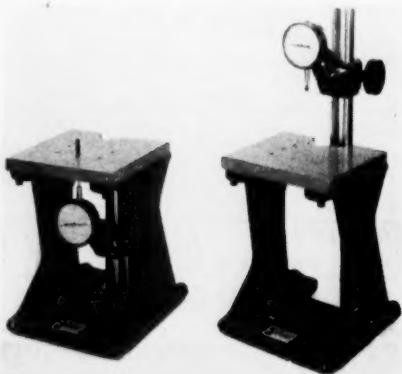
Honnel "Production Master" Hole Locating Device

The device incorporates an alloy cast iron base, table, heat-treated ground shafting, and standard steel drill bushings. The unit is finished with high-grade gray enamel.

## Bench Comparator Is Adaptable to Numerous Uses

Designated as the Model TD-5, a bench comparator which is a general-purpose gage adaptable to numerous uses in the machine shop, toolroom,

Acra-Ment Model TD-5 Bench Comparators

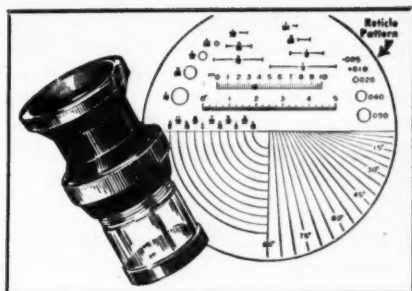


and inspection departments has been announced by Acra-Ment Gage Division of the Meyer Corp., 633 Park Ave., Cranston, R. I. The comparator is designed to measure height, thickness, depth, counterbore depths and diameters, and offsets. These measurements are possible by using the over and under convertible feature of the column and indicator position in reference to the platen surface.

The instrument utilizes a Meehanite cast base with a heavy hardened steel gaging surface. Tapped holes are provided in the platen for gaging fixtures and part-position blocks.

### Pocket Comparator Saves Time in Inspection of Small Parts

Edmund Scientific Corp., Dept. 228, Barrington, N. J., has announced the "Edscorp" Pocket Comparator which is designed for fast, accurate measure-



"Edscorp" Pocket Comparator

ment and inspection of small parts and small dimensions. Measuring approximately  $1\frac{1}{2} \times 2$  inches in size, the comparator provides six-power magnification, and the reticle is calibrated to measure angles, radii, circles, and linear dimensions in both decimal inches and millimeters.

## ENGINEERED

*Live Centers*

Standard shanks with Morse tapers carried in stock send us your specifications and blueprints. We will see that your job is set up with the right LIVE CENTER.

# STURDIMATIC

TOOL COMPANY

3904 F STREET • DETROIT 16, MICH.

Said to aid machinists, tool and die-makers, production engineers, lab technicians, and so on, the instrument can be used for checking layouts and machining on tools, dies, and gages, or to check threads, chamfers, and small holes.



1-Inch Lead Screw for "Auto-Tap" Tapping Attachment

### Larger Type Lead Screw Increases Range of Tapping Attachment

A larger type lead screw which is said to increase the range of lead screws and "Auto-tap" lead screw tapping attachments from  $\frac{1}{16}$  to  $\frac{5}{8}$  inch has been announced by Automatic Methods, Inc., Div. 188, 957 W. Grand St., Elizabeth 2, N. J. The lead screw is designed primarily for use with the 500 Series "Auto-tap" Support Arm.

The larger 1-inch diameter lead screw for driving taps is furnished in a variety of pitches, including 27 and 18 pitch for  $\frac{1}{8}$  and  $\frac{1}{4}$ -inch pipe taps.

A Jacobs Rubberflex collet furnished with the lead screw is said to accommodate tap shanks up to  $\frac{5}{8}$  inch. Special collets for larger size taps are also available. The threads of the lead screw are precision ground for smoothness, accuracy, and long life.

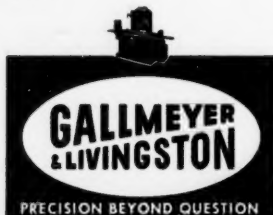


Your production costs — and profits — are materially affected by the sharpness and efficiency of your production tools. Accepted by industry the world over, Grand Rapids No. 10 and No. 12 Motor-Driven Universal Cutter Grinders meet these exact requirements and are now available for delivery upon short notice. Larger Hydraulic Feed Universal and Tool Grinders are available for later delivery. Write today for full data on models to meet your needs.

### GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON CO.  
308 Straight Ave., Grand Rapids, Mich.

MANUFACTURERS OF SURFACE GRINDERS, CUTTER AND TOOL GRINDERS, TAP AND DRILL GRINDERS.

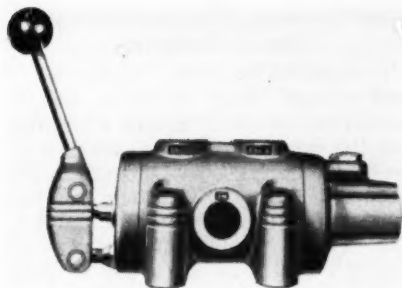


## Hydraulic Valve Features Ball Detents

A hydraulic 4-way valve with ball detents to hold the valve piston in any given position is now being offered by Rivett Lathe & Grinder, Inc., Dept. MMS, Brighton 35, Boston, Mass. According to the manufacturer, the locking action of the detent permits the valve to be mounted vertically as well as horizontally and prevents vibration from causing movement of the valve piston.

The valve is available with one, two, or three ball detents; with one detent the valve piston is held in center position, with two detents the valve piston is held in either end position, and with three detents the valve piston is held in both end and center positions.

Designed for 1,500 p.s.i. pressure,



Rivett 4-Way Ball-Detent Hydraulic Valve

the valve is offered in three different types of operation (threaded stem, lever, and knob), in seven sizes ( $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ , and  $1\frac{1}{2}$ -inch), and in five piston designs to meet the requirements of practically any hydraulic circuit.

*Victor's Specials Deserve Your Attention!*

### EXTRA L-O-N-G LENGTH



#### Straight Shank

## HIGH SPEED DRILLS

Immediate  
Delivery

#### 12" LONG . . . 9" CUTTING FLUTE

Size	Net	Size	Net	Size	Net
1/8	\$1.65	19/64	\$2.25	15/32	\$3.60
9/64	1.65	5/16	2.25	31/64	3.60
5/32	1.65	21/64	2.50	1/2	3.60
11/64	1.65	11/32	2.50	17/32	4.00
3/16	1.65	23/64	2.75	9/16	4.25
13/64	1.80	3/8	2.75	19/32	4.50
7/32	1.80	25/64	3.05	5/8	4.80
15/64	1.95	13/32	3.05	21/32	5.20
1/4	1.95	27/64	3.30	11/16	5.60
17/64	2.05	7/16	3.30	23/32	6.00
9/32	2.05	23/64	3.60	3/4	6.50



## VICTOR MACHINERY EXCHANGE, INC.

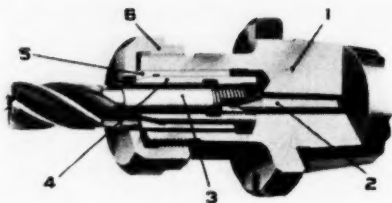
DEALERS IN TOOL ROOM EQUIPMENT

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## Self-Locking Chuck Eliminates Use of Adapters

Designated as the "Autolock," a self-locking chuck which is said to eliminate the use of adapters throughout the range of its two capacities ( $\frac{1}{16}$  to  $\frac{3}{4}$  inch and  $\frac{7}{8}$  to  $1\frac{3}{4}$  inches) has been announced by Clarkson Inc., 320 Ontario St., Toledo, Ohio. Referring to the accompanying illustration, the chuck consists of an arbor or main



Cutaway view of Clarkson "Autolock" Chuck

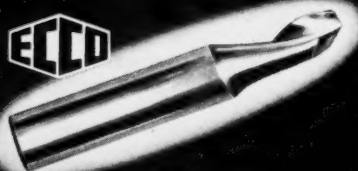
body (1) which is made with a taper to fit any machine; a male center (2) which keeps the cutter centered and ensures rigidity while in operation; a cutter (3); a collet (4); a sleeve (5); and a retaining nut (6).

In operation, any tendency of the cutter to turn, it is claimed, creates a drawing action on the cutter's threaded end which forces the collet down the shank of the cutter. The tapered portion of the collet is thus pressed into the mating taper of the sleeve which, in turn, causes the collet to grip the shank of the cutter even tighter, providing a self-locking grip.

## Safety Vise

An instant-change safety vise designed for fast setups on production pieces and featuring a fast ratchet jaw has been announced by Wahlstrom/Float-Lock Sales Department, American Machine & Foundry Co., 511 Fifth Ave., New York 17, N. Y. The

## EASY-CUTTING EKSTROM, CARLSON



### SPIRAL-FLUTE ROUTER BITS

STRAIGHT OR INVERTED-TAPER SHANKS  
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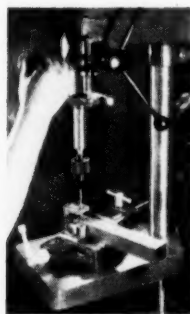
**\$32.**

**F. F. GILMORE & CO.**

**725 Boylston St., Boston 16, Mass.**



vise has three bosses for easy jig attachment, and any number of holes, it is claimed, can be drilled without removing the work as the vise turns over



Float-Lock Safety  
Vise in use

on three sides for maximum drilling flexibility. According to the manufacturer, the vise locks securely by a quarter turn of a T-handle at any position on the table, thus making it a dependable drill jig when duplicate pieces are required. The workpiece is said to be tightly locked, or released, by a hinged handle which operates a screw jaw.

The vise is available with either a

9 or 12-inch jaw opening, and is said to provide an unusual holding device for end drilling and centering, angle drilling, centering long rounds, and drilling sheet metal.

### Magnetic Indicator Holder

Cullen Mfg. Co., 1318 Clark St., Racine 1, Wis., has announced the Erick Model No. 350-A Magna-Holder for indicators up to 3 inches in diameter that features a fine precision lateral adjustment mechanism controlled by a thumbscrew. The mechanism has an adjustment travel of  $\frac{1}{2}$  inch, enabling the operator to zero in the indicator without touching the indicator or workpiece. An aluminum guide block, it is claimed, seals the magnetic field from the indicator attachment, and the magnetic base utilizes permanent Alnico magnets exerting a 50-lb. pull.

A thumbscrew locks the indicator

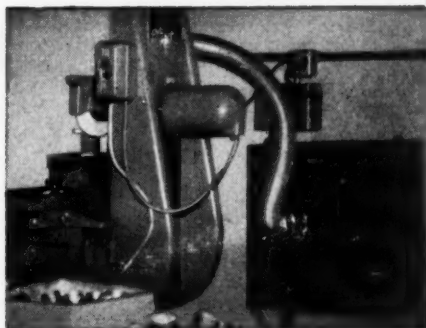
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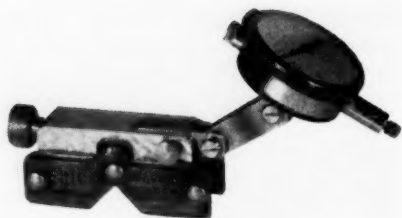
Hollow-ground and bright all over, Reltool End Mills are not only the best looking end mills you ever saw . . . they're proven in performance and cutting efficiency. In addition, they're designed for easy chip flow and 10% to 35% longer cutting life. Next time you need End Mills, re-tool with Reltool!

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**Reltool CORPORATION**  
 RELIABLE METAL CUTTING TOOLS  
 4540 W. BURNHAM ST. • MILWAUKEE 46, WIS.

A 7531-1/2



Erick Model No. 350-A Magna-Holder

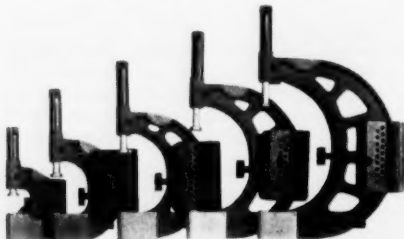
travel slide after the indicator is positioned. A shoulder screw attachment is said to permit the extension bracket to be moved through a 180-degree arc, as well as to permit the indicator to be tilted through a 90-degree arc. The base of the unit measures 3 1/2 inches long x 1 inch high x 1 inch wide.

**Air Snap Gage**

An adjustable air snap gage introduced by Federal Products Corp., 1145 Eddy St., Providence 1, R. I., is of the contact type, which means that the workpiece is positioned directly on the flat, tungsten carbide gage anvils and the user can feel when the piece is in the gaging head correctly. The air jet does not contact the workpiece but, instead, is located in the sensitive anvil assembly. The frictionless movement of this anvil is read on the dial of Federal's Dimensionair, an extra-sensitive instrument which provides a direct reading to the nearest 0.00005 inch.

The wide adjustment of the gage

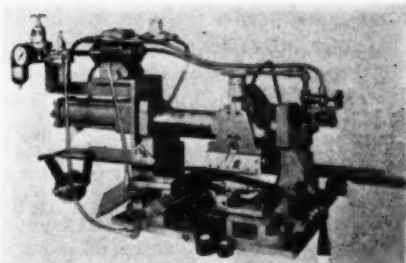
Federal Contact Type Air Snap Gages



makes it possible to cover a capacity from 0 to 6 inches with only five sizes. An unusually large amount of over-travel is said to protect the gage from jamming caused by oversize parts, and an insulating handle is claimed to eliminate the chance of error through heat transfer from the operator's hand.

### **Air-Operated Assembly Combines Feeding, Marking, and Ejection of Parts**

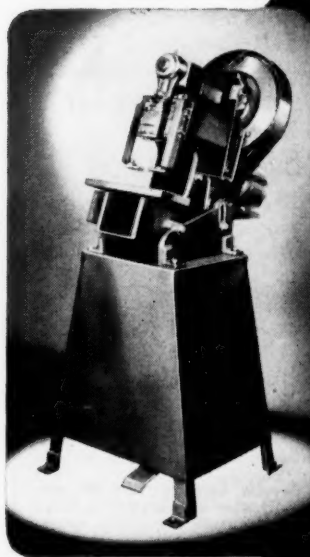
Operated from standard air lines and requiring 75 p.s.i. pressure, an air-operated assembly which is said to combine the feeding, the actual marking, and the ejection of parts automatically has been added to the Series 9AA marking machines produced by The Acromark Co., 9 Morrell St., Elizabeth, N. J. A valve controlling the feed is actuated by each stroke of the marking machine, and at the completion of each stroke another valve is opened,



Acromark Model 9AA Marking Machine equipped with air-operated assembly for automatic feeding, marking, and ejection of parts

providing air pressure to remove the marked part. According to the manufacturer, the machine is capable of marking 40 or more parts per minute.

Overall dimensions of the Model 9AA Marking Machine with this assembly are approximately 30 inches long x 21 inches high x 14 inches deep. The entire machine can be supplied with bench or pedestal mountings.



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Small, powerful inclinable punch press that can be tilted to a maximum of 25°. Fly-wheel at rear permits easier feeding of stock; also provides greater margin of safety. Rated at 275 strokes per minute; length of stroke is 1"; capacity 5 tons. Has non-repeat clutch.

Throat Depth — 6" Throat Height — 7"  
Floor Space — 29" x 22"

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**WHITNEY METAL TOOL COMPANY**  
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## Speed-Reducing Pulleys for Light Drill Presses

Three new models of its speed-reducing pulley, which now make it possible to drill efficiently up to 1 3/8 inches on light drill presses with only a 1/2-h.p. motor, have been announced by Pull-Gear Co., 4118 E. 8 Mile Rd., Detroit 34, Mich. According to the manufacturer, the new models are more ruggedly built to provide increased driving power and are machined to finer tolerances.

Another advantage of the new models is that each unit is now adaptable

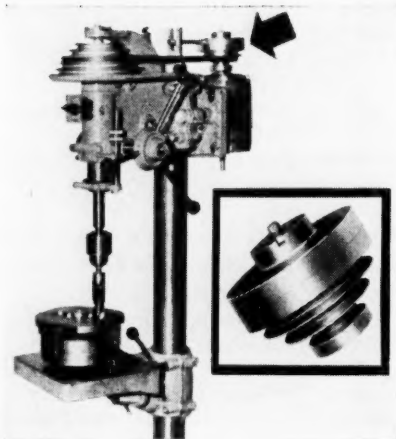


Illustration showing Pull-Gear Speed-Reducing Pulley, including its use on a light drill press

to three motor shaft sizes of 1/2, 5/8, and 3/4 inch. This arrangement is accomplished by means of two reducing sleeves, 3/4 to 5/8 inch and 5/8 to 1/2 inch, thus permitting the units to be transferred to various machines with different motor shaft sizes.

## GEM VISES



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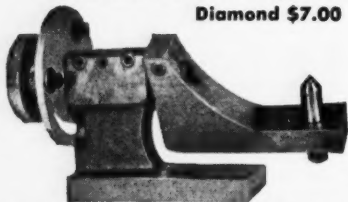
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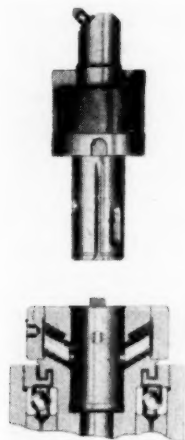
Ball Thrust

Bearing. 24

Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

## Quick-Change High-Precision Spindle for Jig Borers and Automatic Positioners

Designated as the "B F Spindle," a quick-change high-precision spindle designed primarily for use on Fosdick jig borers and automatic positioning machines has been announced by The Fosdick Machine Tool Co., Cincinnati 23, Ohio. The spindle incorporates a high precision version of the "Beaver" tool-holder which is built integrally with the spindle, and straight shank adapters are used to hold tools which are not already provided with Beaver shanks. According to the manufacturer, tools may be preset with plus or minus 0.0001-inch accuracy without resetting on the job.



Fosdick "B F Spindle"

Adapters for the spindle are available to accommodate Nos. 1, 2, 3, and 4 Morse tapers; 5, 7, 9, and 10 Brown & Sharpe tapers; No. 40 N.M.T.B. taper; and straight borers from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch and  $\frac{1}{2}$  to  $1\frac{1}{4}$  inches in eighths.

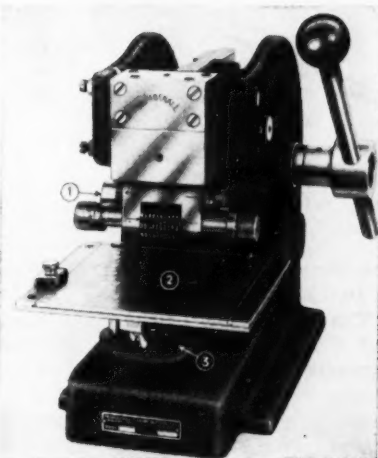
## Device Joins Ends of Round Leather Belting

Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21, Calif., has announced a device for joining the ends of round leather belting without the use of metal hooks. By using the device, it is claimed that the ends of the belt can be tapered and cemented together in less than two minutes, and

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## NEW MODEL 136 BENCH NUMBERING PRESS



This new small, light, compact Press was designed for stamping small Name Plates and small flat articles with up to  $\frac{1}{8}$ " high characters.

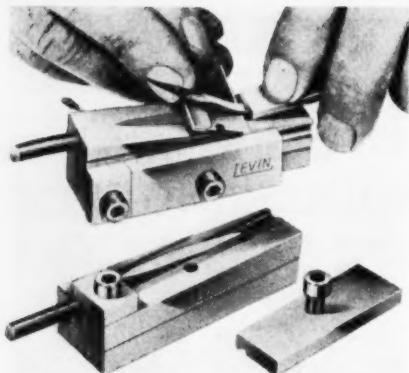
It weighs only 65 lbs. yet has the power and strength of a press much larger in size.

Its compactness and small size, combined with its power, should be very welcome where saving of valuable space and leaving larger power presses free for other work is of importance. The model 136 is hand operated, using a cam to obtain pressure. The fact that this press has only three moving parts makes it extremely easy to maintain. Any Numbering Machine, automatic or non-automatic, Typeholders with interchangeable Steel Type, or Special Dies can be operated in this Press.

Write for Bulletin MW-136

NUMBERALL STAMP & TOOL CO.  
HUGENOT PARK STATEN ISLAND 12, N. Y.





(Top) Round leather belting being trimmed in Levin Belt Splicer. (Bottom) Belt ready for cementing

the cement will set sufficiently for use in two hours or less.

The upper view in the accompanying illustration shows how a 2-inch taper is made by trimming the belt

with a razor blade. The lower view shows the belt ready for cementing. One of the clamps is shown before being applied. At the present time, the belt splicer is available only for  $\frac{3}{8}$ -inch round belting.

### Aerial Grinder Is Available in Three Sizes

An aerial grinder, available in three sizes, which is designed for workbench or production operations in the welding shop, foundry, or auto body shop has been announced by Mall Tool Co., 7814 S. Chicago Ave., Chicago 19, Ill. The tool utilizes an aluminum alloy housing to provide lightweight, and ball bearings are used throughout. The commutator and switch are fully-enclosed to keep out dust and grit. The 6 x 1-inch wheel model has a  $\frac{5}{8}$ -inch hole and a spindle speed of 3,730 r.p.m. free.

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**CHICAGO WHEEL & Mfg. Co.**

Dept. MMS, 1101 West Monroe Street, Chicago 7



Mall Aerial Grinder in use

The 5 x 1-inch wheel model has a  $\frac{1}{2}$ -inch hole and a spindle speed of 4,430 r.p.m., while the 4 x 1-inch wheel model has a  $\frac{1}{2}$ -inch hole and a spindle speed of 5,560 revolutions per minute.

The grinder weighs 12 lb. and measures 22 inches in length x 4.75 inches in width x 4.5 inches in height.

### Tool Block Has Four Faces with Dovetail Channels

Designated as "Marvic," a tool block which has four machine-finished faces with dovetail channels has been an-

Marvic Block in use



*The Wood & Spencer Company*  
Cleveland 3, Ohio

nounced by Marvic, Inc., 350 Peninsular Ave., San Mateo, Calif. The unit employs five basic toolholders which fit the channels and are positively locked in any one of the four faces without changing the block position. The tool block, it is claimed, can be mounted quickly and easily on any engine lathe.

The block is available in three standard sizes to accommodate lathe ranges from 10 to 26 inches. Three sizes of

multiple tool blocks, each with five basic toolholders, can be supplied to match the capacity of the individual lathe. Special holders may be obtained on order.

### Multiple-Hole Punching Process for Short-Run Stamping

A multiple hole punching process with nearly double the blank size range has been developed by Federal Tool &

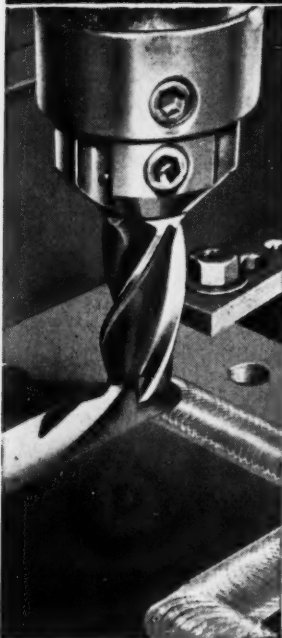
Mfg. Co., 3640 Alabama Ave., Minneapolis 16, Minn. The process is designed specifically for short-run



Typical Federal Multiple-Hole Stamping

stamping operations. According to the manufacturer, multiple holes of varying diameters can be punched simultaneously from any stampable material, and the process reduces the number of press runs with consequent savings in time and labor. Blank size dimensions now range from 4 to 6½ inches, thicknesses from 0.015 to 0.093 inch, and hole sizes from 1/16 to 1/2 inch.

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## HEAVY DUTY END MILLS and HOLDERS

*(Both are Stock Items)*

● Look at this rugged 2" diameter Weldon end mill with 4" long flutes which made a 2½" deep cut in a solid block of die steel—4140 steel heat treated to 260 Brinnell. The feed was 1½" per minute, and the material was removed at a rate of 7½ cubic inches per minute.

This HEAVY DUTY Weldon end mill is held by a new-style end mill holder which bolts securely on to the nose of the milling machine spindle. The holder, located by a centering plug, is driven by two drive keys on the spindle nose. The 2" diameter shanks of these heavy-duty end mills are securely held by two large hollow head screws.

For top performance and sturdy long life in end mills—large or small—look to Weldon.

*Weldon distributors throughout U.S.A. and Canada  
carry complete stocks to serve you.*

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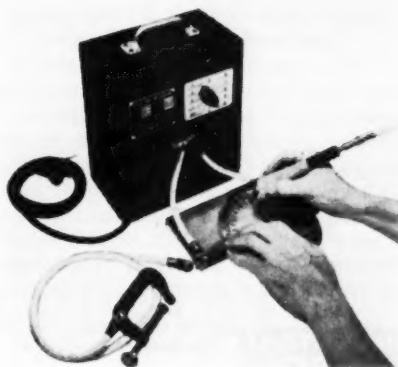
# THE WELDON TOOL COMPANY

3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

## Portable Unit Marks All Steels, Alloy Steels, and Ferrous Alloys

Designated as the Electro-Marker, a portable electric marker which is designed for freehand marking on all steels (before and after hardening), alloy steels, and ferrous alloys, in addition to cast and wrought iron, has been announced by H. P. Preis Engraving Machine Co., 188 Industrial Branch, 657 U. S. Route 22, Hillside, N. J. The unit features a 10-station rotary switch and regulating knob which are said to enable the operator to make a light mark or bold mark by means of a simple adjustment of the dial.

The marker is available in two sizes; namely, the Model EM-60 (standard) and the Model EM-120 (heavy duty), each of which is designed for use with 115 or 230-volt, a.c., 50 or 60 cycle. The Model EM-60 is a 500-watt unit



Preis Electro-Marker in use

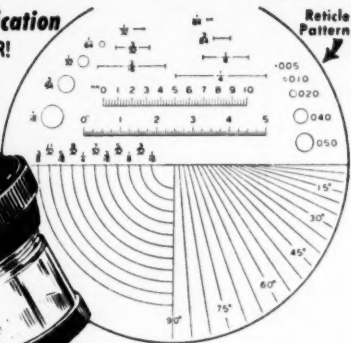
while the Model EM-120 is a 1,000-watt unit. The overall size is 8 1/4 inches wide x 10 inches high x 5 inches deep and 6 1/4 inches deep for the two models respectively.

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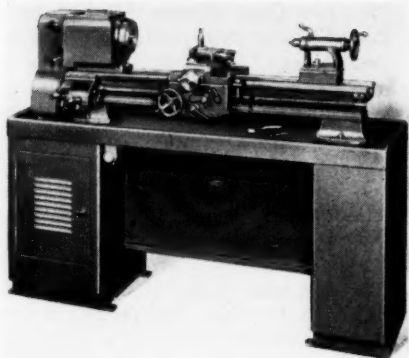
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**EDMUND SCIENTIFIC CORP., Barrington, N. J.**

## Lathe Has 12-Inch Swing over Bed and Saddle Wings

Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill., has announced a lathe which features a 12-inch swing over bed and saddle wings, a 1-inch collet capacity, a 1 $\frac{3}{8}$ -inch spindle hole, and center distances of 23 and 35 inches. The lathe also utilizes a heavy headstock, double V-belt outboard drive, massively-proportioned ball-bearing mounted spindle, and



Logan 12-Inch Lathe

precision-built carriage. Mounted on double rows of oversize wide-spaced ball bearings at each end of the headstock, the spindle is said to provide sustained accuracy through 16 speeds from 38 to 1,260 r.p.m. The carriage has large dials for accurate readings and a lever-operated disc-type clutch.

Precision-ground top surfaces on the cross slide and saddle are said to permit mounting fixtures and the use of magnetic indicators. The cross slide bearing surfaces are extra wide and long. The compound is massive for rigid tool support, and the apron operates in a bath of oil. The bed is of a rugged, heavily-ribbed, balanced construction with two V-ways and two flat ways, precision ground to a tolerance of 0.0005 inch.

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**STAINLESS STEEL**  
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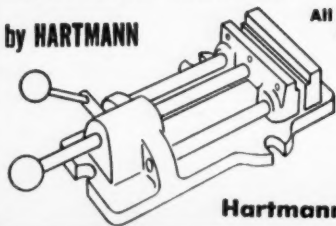
**JOHN REINER & CO.**

12-12 37th Avenue

Long Island City 1, N. Y.

## INSTANT ACTION

by **HARTMANN**



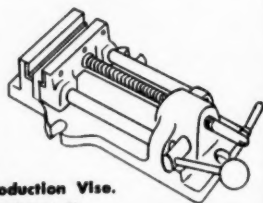
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All Purpose Tool Room And  
Machine Shop Vises.

The

## JAWSET

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**Hartmann Mfg. Co., 1637 Gould St., Racine, Wis.**

## Drilling Unit Performs Single and Multiple Feed Rate Operations

Designated as the Model 14 "Holo-matic," a drilling unit, weighing 30 lb., which is said to perform single and multiple feed rate operations has been announced by **Ha use Engineering**, Montpelier, Ohio. Powered by compressed air and hydraulically fed, the unit is said to be suitable for auto-

matic or manual cycle control. According to the manufacturer, the stroke is adjustable to 4 inches with ample thrust for  $\frac{1}{2}$ -inch diameter drilling in steel. Positive stop with a dwell or instantaneous retract operation, continuous cycling, skip drilling, back feeding, and manual jogging are said to be easily achieved.

Rotary air motors available in a va-

## 10<sup>TH</sup> ANNIVERSARY

1943 1953



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Celebrating our tenth anniversary The Dearborn Spring and Manufacturing Company wishes to thank all customers, employees, and suppliers for contributing to ten years of growth and progress.

Our modern plant now has over fifty employees specializing in the manufacture of precision machine parts for the aircraft and hydraulic industries.

The anniversary also marks the incorporation of the company. S. Harold Edlund, the founder, becomes President and Chairman of the Board. Robert J.

Tolonen, who came to the organization in 1951 from Ford Motor Company, is Vice President and General Manager. Other officers are Mrs. Mildred Edlund, Secretary & Treasurer, Attorney Jarl A. Andeer—Legal Counsel and Ralph M. Law, CPA, is Accounting Supervisor.

This organization is pledged to continued production of high quality precision products—and continued expansion to meet the increased demands of our customers.



PRES. EDLUND

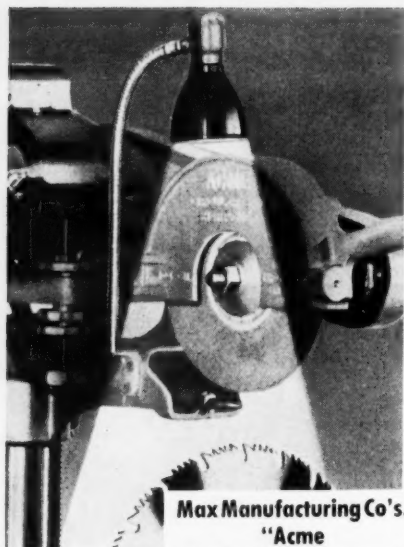


Vice-Pres. TOLONEN

**DEARBORN SPRING AND MANUFACTURING CO. INC.**

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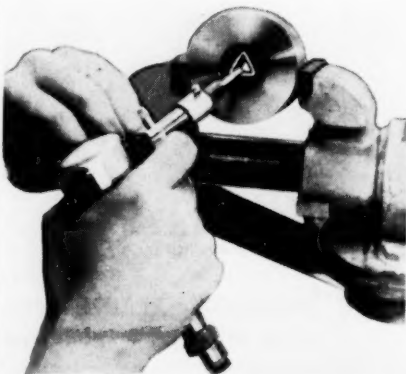
Hause Model 14 "Holomatic" Drilling Unit

riety of capacities to  $\frac{3}{4}$  h.p. and speeds of 500 to 15,000 r.p.m., it is claimed, provide the unit with a wide working range. The unit can be arranged to suit a wide variety of requirements and can be mounted in horizontal, vertical, or angular planes.

#### Die Filer Is Particularly Designed for Tungsten Carbide

Designed for repairing, altering, or producing tungsten carbide dies from presintered carbide, the Nord Di-Profiler which is said to have vibration-

Nord Di-Profiler in use

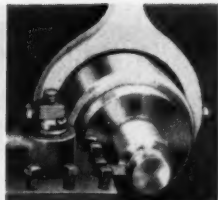
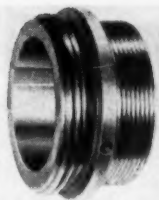


less operation and which features a stroke adjustable from 0 to 0.250 inch has been announced by Nord International Corp., P. O. Box 44-N102, Denville, N. J. Full ball bearing construction is utilized, and the action of the tool is said to be reciprocating and oscillating at will to the amount desired. When used with a spindle attachment, finely controlled rotary action, it is claimed, is also obtainable.

For use with the tool, a wide variety of diamond files in standard and special shapes is available, as well as a complete line of burs in round, inverted cone, straight, taper, and other styles. Special fixtures for holding stones in a range of abrasive grains for other work can also be supplied.

#### Nut Adapts Collet Chuck to Taper Spindle Lathes

An adapter nut which is designed to adapt the Hall Model B-2-Inch Col-

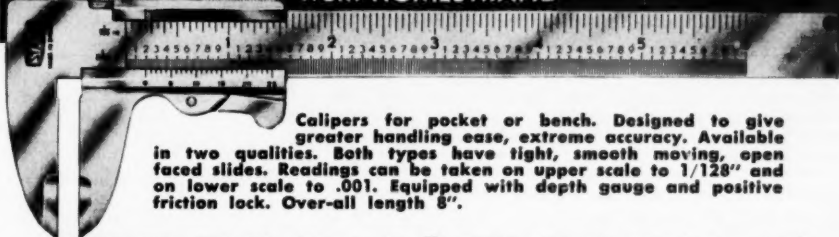


(Left) Hall Adapter Nut. (Right) Hall Model B-2-Inch Collet Chuck

let Chuck to L-00 taper spindle lathes, such as the Clausing, LeBlond, Cincinnati, Rivett, South Bend, and others, has been announced by Hall Mfg. Co., Dept. B, 622 Tularosa Drive, Los Angeles 26, Calif. According to the manufacturer, the chuck is easy, fast, and safe to operate and has no latches, fingers, cams, dogs, locks, or other irregular parts. The chuck, it is claimed, can be opened and closed with a slap of the hand while the lathe is running full speed.

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## NEW SHOP LITERATURE

**Taper Products.** A 16-page two-color catalog (No. 37) released by The Collis Co., Dept. A, Clinton, Iowa, describes and illustrates its line of drill sockets, drill sleeves, cutter bars, chucks and collets, taper sleeves, lathe centers, sockets and arbors, lathe bushings, drill drifts, and pipe centers. Specifications are included.

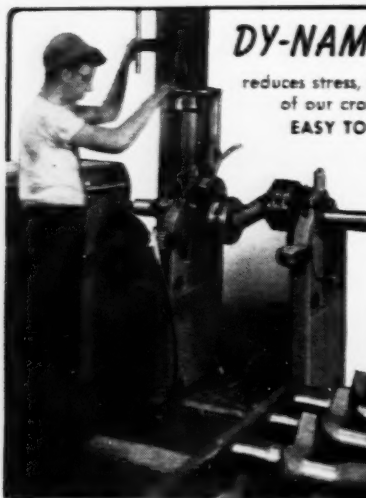
**Tap Tips.** A handy handbook for tap users which is full of information on tapping methods and tap selection has been issued by Besly-Welles Corp., 108 Dearborn Ave., Beloit, Wisconsin.

**Profile Milling Machine.** A 16-page bulletin (1140) published by Onsrud Machine Works, Inc., 3924 Palmer St., Chicago 47, Ill., completely describes and illustrates the Onsrud Model A-72 InvOmil, a profile milling machine for high spindle speed and high feed non-ferrous metal milling. The bulletin provides a complete technical

presentation of design, construction, and machine movement. Of particular interest is a detailed series of illustrations showing how the InvOmil head feeds during milling operations.

**Lathe Attachment.** A four-page two-color bulletin released by General Roto Co., 334 E. Washington Blvd., Los Angeles 15, Calif., describes and illustrates the Roto Head lathe attachment which is designed for multiplying small lathe production of duplicate parts. Information on applications and line drawings are included.

**Cemented Carbides.** A 16-page two-color publication (No. C-53) released by Kennametal Inc., Latrobe, Pa., provides essential technical data on Kennametal and Kentanium, including mechanical and physical properties. Suggestions for various design applications are included.



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reduces stress, produces smooth operation  
of our crankshafts...and makes it so  
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balance rotating parts weighing from 4 oz. to 8 tons

**Mill Heads.** A 16-page two-color bulletin released by Rusnok Tool Works, 4840 W. North Ave., Chicago 39, Ill., fully describes and illustrates its line of light, medium, and heavy-duty mill heads for vertical, angular, and compound angle work on horizontal mills. Information on brackets, parts, and tools is included, as well as drawings and specifications.

**Cutting Tool Materials.** In compact form and quite impartially, a 36-page 8½ x 11-inch booklet on cutting tool materials issued by Allegheny Ludlum Steel Corp., Dept. MS-43, Henry W. Oliver Bldg., Pittsburgh 22, Pa., presents the basic facts that enable the reader to speedily compare the suitability of various tool materials for specific uses.

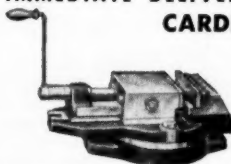
**Draw-In Collets.** Bulletin No. 50 distributed by Hardinge Brothers, Inc., Elmira, N. Y., contains helpful ordering information on and an up-to-date listing of popular style collets for all makes of lathes and millers. Included are data on major dimensions; maximum capacity for round, square, and hexagon; collet adaptations for nose type chucks; stocking locations; how to order; and prices.

**Air Valves and Clamps.** The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y., has issued an illustrated catalog on its line of air valves and clamps. Information on replacement parts and prices are included.

**Pressroom Equipment.** A 16-page two-color catalog released by Durant Tool Supply Co., 155 Orange St., Providence 3, R. I., fully describes and illustrates its line of pressroom equipment, including roll feeds, stock reels, coil cradles, stock oilers, foot presses, scrap choppers, wire straighteners, and stock straighteners. Complete specifications and prices are included.

**Drilling Machine.** An eight-page three-color catalog (No. DM) issued by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y., fully describes and illustrates the deluxe and standard models of the Wales Drilling Machine which is designed for precision layout, drilling, reaming, and boring of holes. Data on set-up operations, features, and accessories, as well as specifications and dimensional drawings, are included in the catalog.

## IMMEDIATE DELIVERY FROM STOCK • BRITISH MADE • GUARANTEED CARDINAL SCREW-ACTION MACHINE VISES

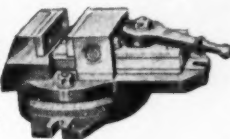


Semi-Steel Bodies, Tool Steel Jaws, hardened and ground to precise limits. Screw completely enclosed, preventing damage due to intrusion of chips. All vises have flanges for clamping to tables of millers, planers, etc. Each vise supplied complete with bolts, nuts and washers. Swivel bases graduated in degrees on both Screw and Cam-Action Vises.

Code No.	Width of Jaws	Depth of Jaws	Jaws Open	Weight with Swivel	Price with Swivel
MVS 5	5 1/4"	1 1/4"	2 3/4"	59 lbs.	\$ 60.00
MVS 6	6 1/4"	1 3/8"	3 3/8"	104	85.00
MVS 7	7 1/4"	2"	4 1/2"	127	120.00

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Some high quality materials and construction as Screw-Action Type. Cam is Tool Steel, hardened and ground. Cam-Action Vise meets a need for a machine vise with jaws that can be operated instantaneously. Rough adjustment of jaws in steps of 1/4", corresponding to pitch of teeth on rack of under-side of movable jaw. These engage similar teeth in base of vise, the two parts being secured by a pad bolt. Quick opening of jaws by cam imparts a movement to jaw of 9/32".



Code No.	Width of Jaws	Depth of Jaws	Jaws Open	Weight with Swivel	Price with Swivel
CVS 1	3 1/4"	1 1/4"	2 3/4"	33 lbs.	\$ 50.00
CVS 2	4 1/4"	1 3/8"	2 3/4"	44	65.00
CVS 3	5 1/4"	1 3/8"	2 3/4"	63	75.00
CVS 4	6 1/4"	1 3/8"	3 1/2"	98	85.00

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**"Properties and Uses of Pure Molybdenum Disulphide as a Lubricant"** is the title of a reprint issued by The Alpha Corp., Greenwich, Conn., which comprises a paper presented before a meeting of the American Society of Lubrication Engineers. The paper covers an analysis of the compound and the qualities which make it an ideal lubricant—it's chemical stability, electrical properties, purity, anti-corrosion properties, thermal stability, coefficient of friction, and the various methods of application. The paper is complete with a series of graphic illustrations.

**Metal Hose.** A 48-page two-color catalog (No. 200) issued by Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J., fully describes and illustrates "Titeflex" Helically-Wound Flexible Metal Tubing and "Uniflex" Helical-Corrugated Flexible Metal Tubing. Ordering information for flexible metal conduit and ferrules, hose assemblies, ignition shielding and components for reciprocating engines, bendable pipe, and high and low-frequency leads, as well as charts showing frictional losses versus flow rates for various sizes of metal hose and conduit, is included.

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**Vises, V-Blocks, and Rotary Tables.** De Witt Equipment Co., 136 Lafayette St., New York 13, N. W., has released an illustrated bulletin describing a line of multi-angle universal vise, tool-makers vises, V-blocks, and precision rotary tables. Complete specifications regarding the various items are provided in the bulletin.

**Wire Thread Inserts.** A two-color illustrated bulletin (No. 661) issued by Heli-Coil Corp., 1321 Shelter Rock Lane, Danbury, Conn., fully explains of stainless steel or phosphor bronze protect tapped threads in aluminum, magnesium, die-cast metals, plastics, iron, steel, brass, bronze, and wood. The bulletin also explains wire thread insert use in design, production salvage, and maintenance and lists the available thread classifications. Six case histories are included.

**Center - Distance Gage.** The Sorenson Center - Mike, a handy center - distance gage for determining the distance between centers of holes quickly and accurately, is described and illustrated in a four-page two-color bulletin (652) issued by Sorenson Center-Mikes, Inc., 264 Kosuth St., Bridgeport 8, Conn. Tabular information on types and ranges of Center-Mikes is included.

**Precision Toolroom Lathe.** An 18-page illustrated catalog (No. 1020B) issued by Rivett Lathe & Grinder, Inc., Dept. MMS, Brighton 35, Boston, Mass., fully describes its Model No. 1020 12-Inch Swing Precision Toolroom Lathe. Information on features and specifications are included.

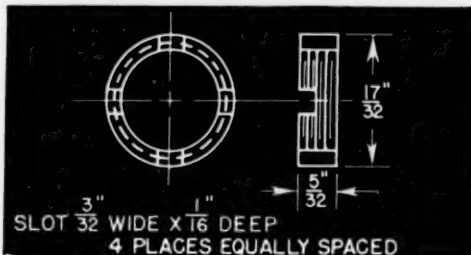
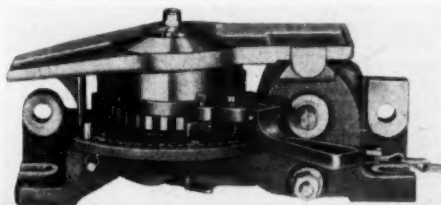
**Cam Automatics,** products of The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio, are shown and described in a four-page three-color bulletin (No. 4000) issued by this firm. Data on these machines in performing cut-off, forming, and single-end operations on valve tappets, electric motor rotors, and shells using single and twin-spindle models are included.

**Relays, Contactors, Shaded Pole Motors, and Electro-Mechanical Assemblies.** A 20-page two-color catalog No. 122) published by Potter & Brumfield, Princeton, Ind., fully describes and illustrates its line of relays, contactors, shaded pole motors, and electro-mechanical assemblies. Complete technical information on each standard relay in the Potter & Brumfield line is included. Specifications and dimensional drawings are provided, as well as ordering information.

**Weldirectory for Hard Surfacing.** The Lincoln Electric Co., 22801 St. Clair Ave. Cleveland 17, Ohio, has published a new edition of its Weldirectory for Hard Surfacing (Bulletin 466) which features a general discussion on arc weld surfacing and an entirely new chart or hard-surfacing guide. The material presented on hard-surfacing fluxes is also new.

**Toolholders.** Metal Carbides Corp., Youngstown 7, Ohio, has released a four-page circular (No. KL-53) which describes the Klamp-Lok Toolholder that utilizes standard carbide blanks and mechanically clamps the blanks to the toolholder in a horizontal position.

## CUT COSTS ON SECONDARY OPERATIONS WITH THE DEARBORN AUTOMATIC CHUCKING AND INDEXING FIXTURE



This piece was made from brass rod and slotted as shown in the print. Reproduction on this item was 1,200 pieces per hour.

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**Equipment for Machining Jet Engine Parts.** An eight-page two-color bulletin (No. 50731) released by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich., describes and illustrates in detail five machines and the sequence of operations used for the machining of jet rotor blades and buckets from rough forgings to highly finished precision products. The bulletin also illustrates and describes two vertical machines used for machining compressor rotor discs, engine frames, and other large round parts.

**Threading Tools.** A 16-page two-color catalog (No. MU-153) published by Murchey Division of Sheffield Corp., Dayton 1, Ohio, fully describes and illustrates the Murchey line of threading tools, including radial die heads (both rotating and non-rotating types), tangent die heads, solid adjustable taps, machine taps, pipe taps, chasers, and accessories. Special threading tools are also covered. Specifications are included.

**Gear Finishing Machines.** Equipment for precision finishing of gears up to 15 feet in diameter for marine, railroad, power plant, ordnance, and other uses is covered in an eight-page two-color illustrated bulletin (No. V-53) entitled "V-Series Gear Finishing Machines" now available from Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Machine and motor specifications, together with information on special features of the V-series machines, are included in the bulletin.

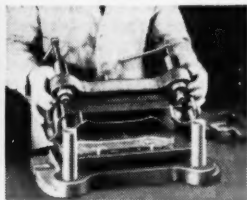
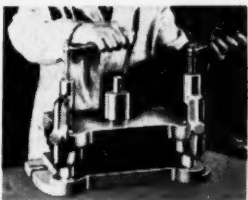
**Grinding Machines.** A six-page two-color folder (No. 549) released by Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y., fully describes and illustrates the Hartex line of hydraulic, centerless, universal plain cylindrical, internal, and heavy-duty cylindrical grinding machines. Complete specifications are provided.

**Socket Screw Products.** Standard Pressed Steel Co., Box 556, Jenkintown, Pa., has issued a four-page two-color folder illustrating and describing the advantages of its Unbrako socket screw products, including socket head cap screws, self-locking socket set screws, shoulder screws, flat head socket cap screws, and button head socket screws. Also included in the folder are descriptions of socket screw keys, square head set screws, pressure plugs, and dowel pins.

## Separate Die Sets This *Fast*, Simple Way . . .

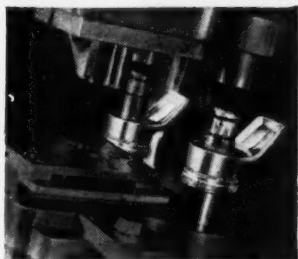


The principle of the Acro Die Set Puller is to remove the punch holder from the die shoe by a straight upward pull, whereby punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This is accomplished only by use of the indexed screw wrenches which act as indicators, controlling the upward travel. This is an exclusive patented Acro feature, found only in Acro Die Set Pullers.



## AND, Protect Leader Pins With These Efficient Oilers

Acro Pin Oilers fit over each leader pin and seal in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly over leader pins. Eliminate bushing wear, leader pin scoring, and maintain die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.



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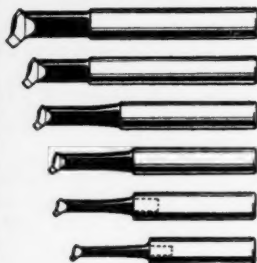
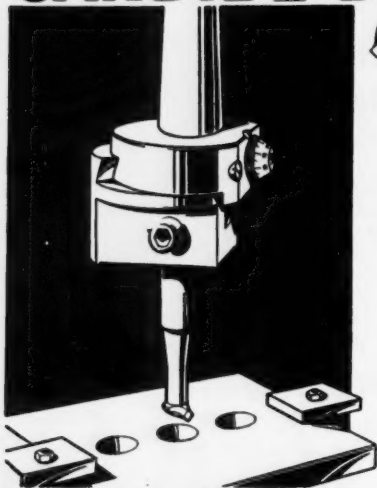
**Floor and Bench-Model Lathes.** A 12-page illustrated catalog (No. 5304) released by South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind., fully describes its line of 9-inch lathes which are available in both floor and bench models. Graphic line drawings of features and data on 42 different attachments and accessories are included in the catalog.

**Socket Screw Products.** Catalog No. 25 on "B-Right-On" Socket screw products available from The Brighton Screw & Mfg. Co., Reading Rd. at Dorchester, Cincinnati 2, Ohio, provides latest list price information on the Brighton line, including stainless steel socket head cap screws and hex socket set screws. One section of the catalog is devoted to technical and engineering data on Brighton screws. Data on improved design through the use of socket screws are included, along with strength comparisons between ordinary hex head cap screws and Brighton alloy steel socket head screws. Information is also presented on the new methods and processes developed and used by Brighton in socket screw manufacture.

**Lathe Attachments.** An eight-page two-color bulletin released by The Nebel Machine Tool Co., Cincinnati 25, Ohio, fully describes and illustrates its line of attachments for use on Nebel engine, removable block gap, and extension bed gap lathes. The attachments described include air-operated equipment, variable speed drives, power rapid traverse, hydraulic duplicating attachments, micrometer carriage stops, adjustable thread stops, pipe centers, collet attachments, chucks, faceplates, extension turning attachments, tool and stock rests, and others. Specifications are included in the bulletin.

**Linear Actuators** for aircraft application are covered in a four-page two-color bulletin (F4381-1) available from Barber-Colman Co., 656 Rock St., Rockford, Ill. The bulletin emphasizes the design features and provides application information plus specification data on these new, compact and lightweight units which are used in remote positioning of aircraft engine controls, trim tabs, oil cooler shutters, and valves, and in similar functions where linear motion is required.

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**Double - Crank Straight - Side Power Presses.** A four-page three-color bulletin (No. 225) released by Clearing Machine Corp., 6493 W. 65th St., Chicago 38, Ill., fully describes and illustrates its line of double-crank straight-side power presses with capacities from 100 to 250 tons. Complete specifications are included.


**Universal and Tool Grinder.** A 24-page two-color catalog (No. K-53) released by Landis Tool Co., Waynesboro, Pa., fully describes and illustrates its 12 x 28-inch universal and tool grinder which can also be used for a wide variety of toolroom work, including the grinding of tools and cutters. Information on operating features, equipment, and typical grinding operations, as well as complete specifications, is included.

**Turret Lathes.** South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind., has issued a four-page two-color bulletin (No. 5306CD) which describes and illustrates its No. 2-H Turret Lathe which is designed for the efficient production of duplicate parts. Data on attachments and accessories, as well as complete specifications, are included.



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**CUTTING TOOLS**  
for Increased  
Productivity

**KENAMETAL Inc. LATROBE, PA.**  
**CEMENTED CARBIDE TOOLS,**  
**BLANKS, MILLING CUTTERS**



**Carbide Tool Price List.** A special condensed price list and catalog (GT-265)—the "Brief-A-Log"—which includes details on all new price adjustments and specifications of its standard cemented carbide tools and blanks has been prepared by Carbology Department of General Electric Co., 11143 E. 8 Mile Blvd., Detroit 32, Mich. Besides listing the products affected by recent price cuts, and the new lower prices, the 20-page "executive's briefer" provides essential buying information required in specifying cemented carbide tools and blanks.

**Fixture Clamps.** Siewek Tool Co., 2862 E. Grand Blvd., Detroit 2, Mich., has published a catalog (No. 8) covering over 50 new fixture clamps in various sizes and styles. Data on drill jigs which are available in 13 styles and 161 sizes, including the spring type and the rack and pinion type, are included in the catalog.

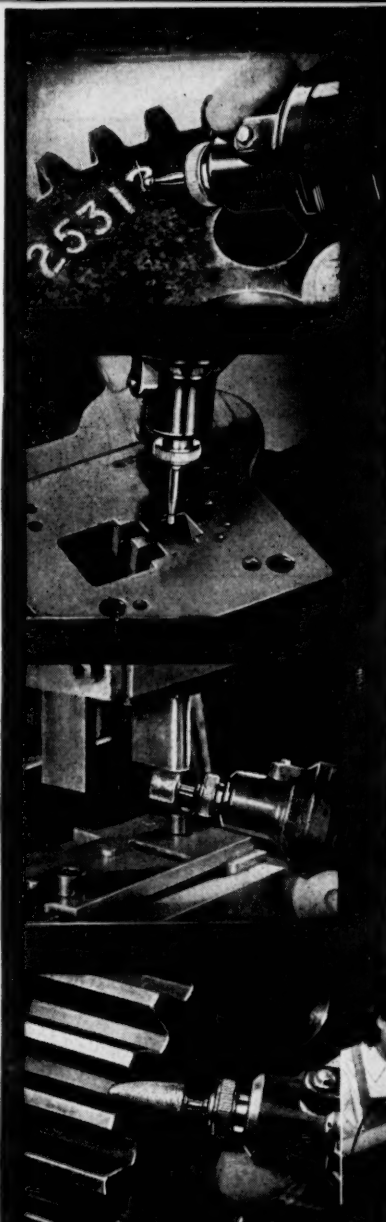
**Soldering Fluxes.** A 12-page catalog published by Kester Solder Co., 4275 Wrightwood Ave., Chicago 39, Ill., contains detailed information on the firm's wide variety of flux formulas and is designed to aid the industrial solder user in his selection of fluxes for both production use and experimental purposes.

**Open Back Inclinable Presses** equipped with mechanical sleeve clutches are featured in a 24-page three-color bulletin (58-L) published by Niagara Machine & Tool Works, Buffalo 11, N. Y. Illustrated and descriptive information on sizes for light to medium tonnage work and for medium to heavy tonnage work is included, along with data on die cushions for drawing operations; specifications; modifications for special applications; press selection; automatic feeds; and variable speed drives.

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the "Where to Get It" section of MODERN MACHINE SHOP, originated in February, 1940, provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 368, 370, 372 and 374.)

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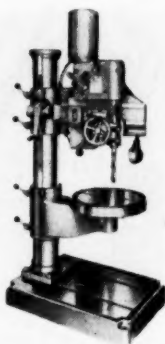
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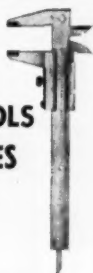
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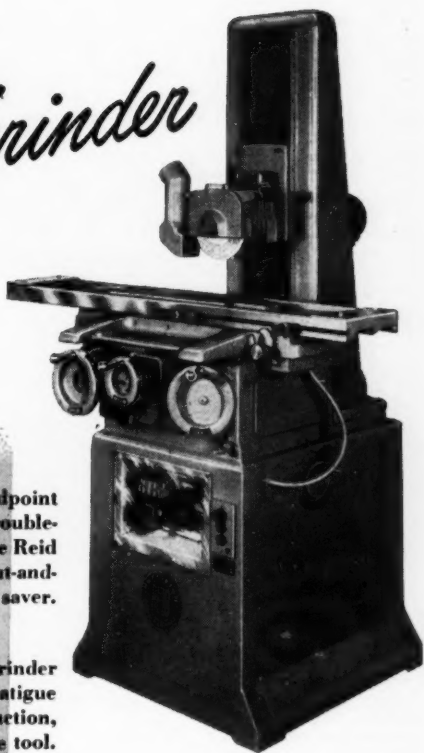
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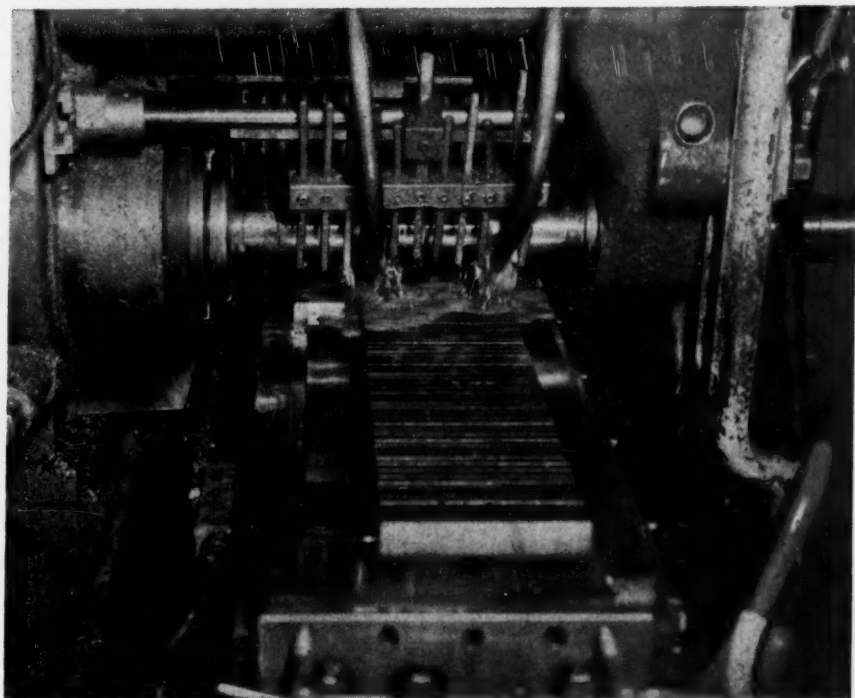
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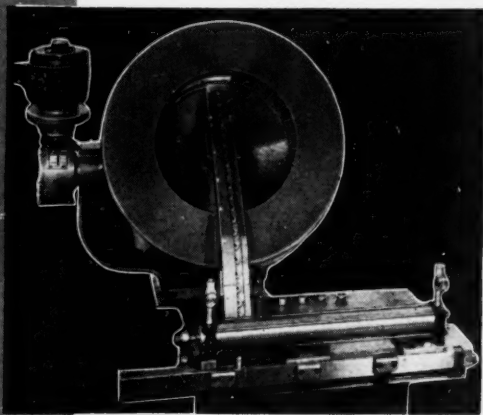
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## the last word

### Production—The Key

**A**MERICANS, like people all over the rest of the world, are wondering what will happen if genuine peace comes to Korea. Many are convinced that our economy will be drastically affected, while others feel that "normal" conditions will once again prevail. Regardless of what happens it might be well to take a look at some of the changes in thinking which have taken place during the past few years and which will undoubtedly affect the future.

For a long time we have concentrated upon stability and have sought for means to avoid another depression. However, more and more business leaders are beginning to focus their attention upon production—upon a dynamic economy of plenty.

There are reasons to believe that within thirty years our national income may increase to 400 billion dollars annually; that the purchasing power of the workman's wages may double. There are also reasons for believing that our national income might decrease to 120 billion dollars a year, that the purchasing power of the workman's dollar might decrease by 50 per cent, and that the standard of living for the entire nation might go down 50 per cent below today's level within 20 years.

Whether this nation moves on to a high-

er national income, to higher purchasing power of the workingman's wages, shorter hours, in an economy of plenty; or whether we move to the lower income, the lower purchasing power of wages and the lower standard of living for the entire nation, depends upon what we do with our present American heritage.

This heritage does not consist of our wide fields, our fertile plains, our cities, our bank accounts, our coal, iron, oil, gas, and other natural resources. There are other nations that have resources in equal quantity and Russia has two times our quantity. Our heritage, which is unique to America alone, is our unparalleled productive system.

Without being aware of what was actually happening and without central direction, America has achieved a man hour productivity two times as high as that enjoyed in the best countries of Europe. It is a statistical fact that an American workman can buy with his wages two times as much food, clothing, housing, entertainment, and education for his children as a workman at a similar job in the best countries of Europe and five times as much as in Russia. It is also a statistical fact that our national income is equal to the national income of the next six highest countries. It is likewise a fact that we send more young people to high school and college than does all of the rest of the world combined.

Production offers the only means of creating wealth. A measure of our productive capacity occurred shortly after the outbreak of the Korean war when plans were made—and executed, to produce vast quantities of armament and untold amounts of civilian products at the same time. As a result, no country on the face of the earth since time began has lived on so high a standard of living while war was being waged.

A production record similar to ours in China, in India, or Africa, would dispel the poverty that is proverbial there. If Russia had a productive capacity equal to ours she could in one generation rule the entire earth.

### Pattern of Spending— Federal Style

**T**HE famous statement attributed to Mark Twain in his comment on the weather could, it seems, most appropriately be applied to the subject of Federal taxes. A look at the final tally on Federal finances for the fiscal year which ended June 30 shows that in spite of the greatest tax collections in any year in our history, Uncle Sam wound up the year further in the red than at any time except in two full-scale wars. June 30 has traditionally been a big spending day, partly because of interest payments on the Federal debt, which fall due on that day; and according to some observers, partly because of efforts by agencies to spend unused funds so that they will not revert to the Treasury. Spending for the entire month was 32 per cent above the average for the other eleven months of the year and the peak spending on the one day of June 30 was the highest for any June 30 in history.

Among the agencies and activities whose spending was higher in June 1953 than June 1952 were: Commodity Credit

Corporation, up 1,109 per cent; other activities of the Production and Marketing Administration, up 634 per cent; Forest Service, up 68 per cent; Office of Education, up 48 per cent; foreign military assistance, up 40 per cent; and the Legislative Branch, up 28 per cent. Percentage increases in the Army, Navy, and Air Force were considerably smaller, ranging from 18 per cent in the Army down to 13 per cent in the Navy.

### Emotionally Disturbed Employees

**C**ODDLING is not always the best way to help the emotionally-disturbed employee. Sometimes he will get well sooner if required to accept the normal responsibilities of his job and to perform like other workers in his group. That is the conclusion of Dr. Gerald Gordon, psychiatrist, of E. I. du Pont de Nemours and Company, following a four-year experiment in a du Pont plant.

During the four years, seven per cent of the plant's employees were treated. As employees, most of them had been "difficult." They had more accidents than the average. They were absent oftener. They visited the dispensary more frequently and took up more time of the physicians, nurses, supervisors and shop stewards.

Except for those with some serious organic ailment, patients were sent back, after diagnosis, to full regular duty on the same job. Supervisors were briefed on the proposed treatment and asked to cooperate by requiring the patient to live up to his full responsibility.

Where supervisors cooperated, the patient was helped. On the other hand, where supervision failed to follow the medical recommendations and insisted on coddling and appeasing the employee, failures usually resulted, according to Dr. Gordon.

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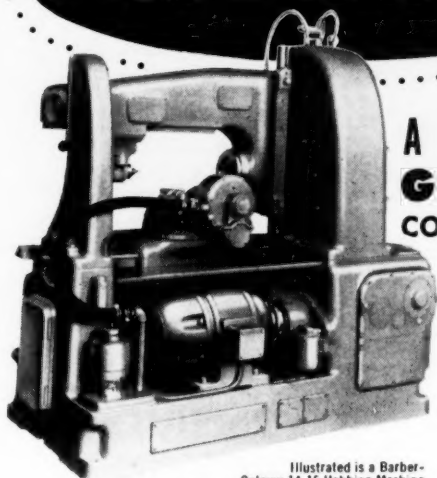
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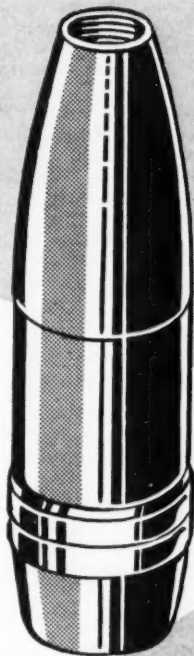
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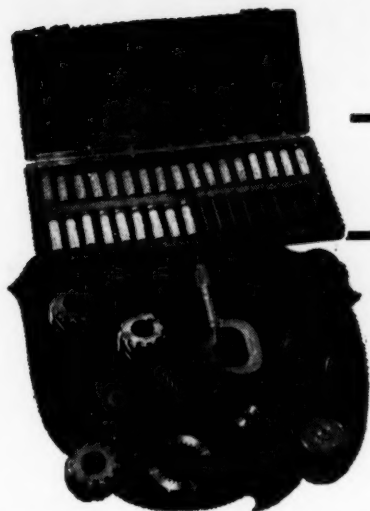
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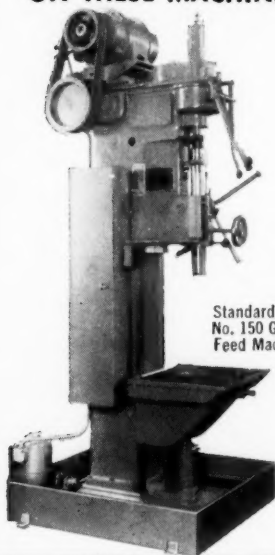
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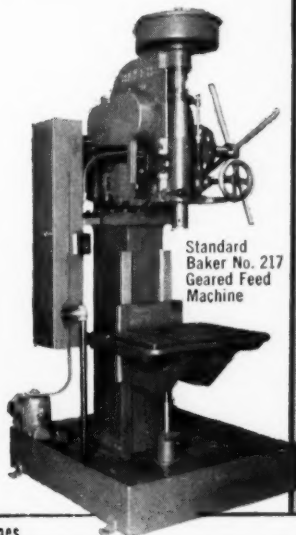
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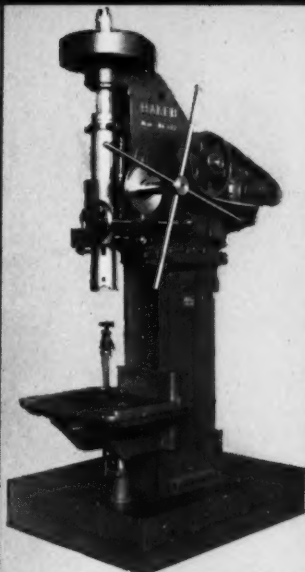
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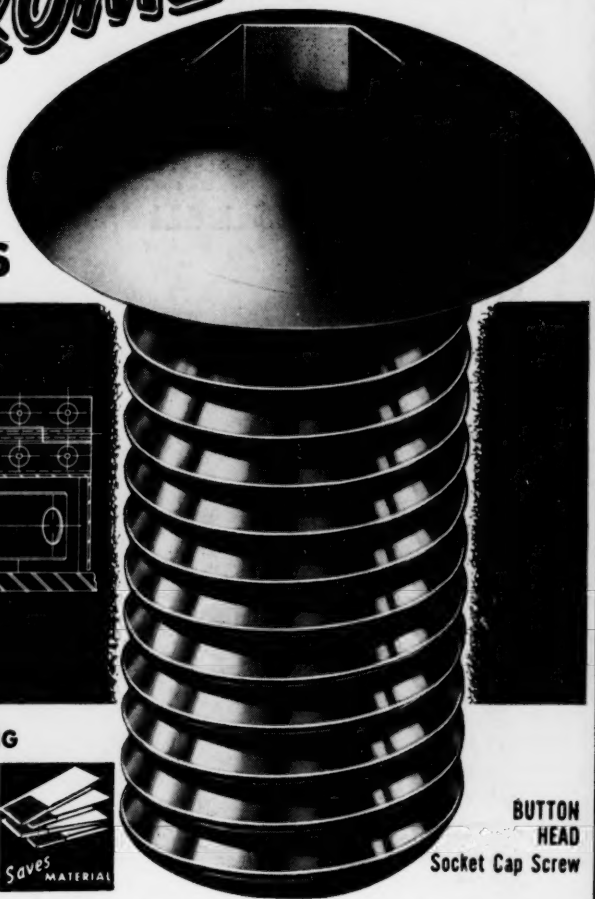
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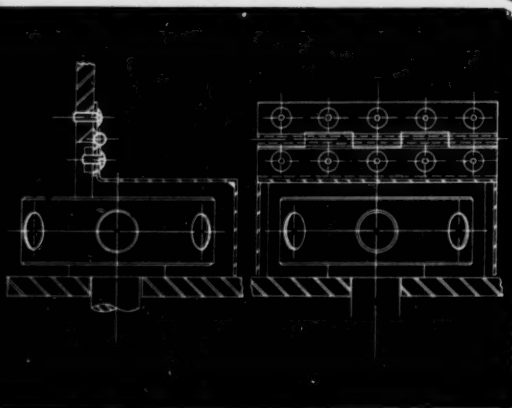
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